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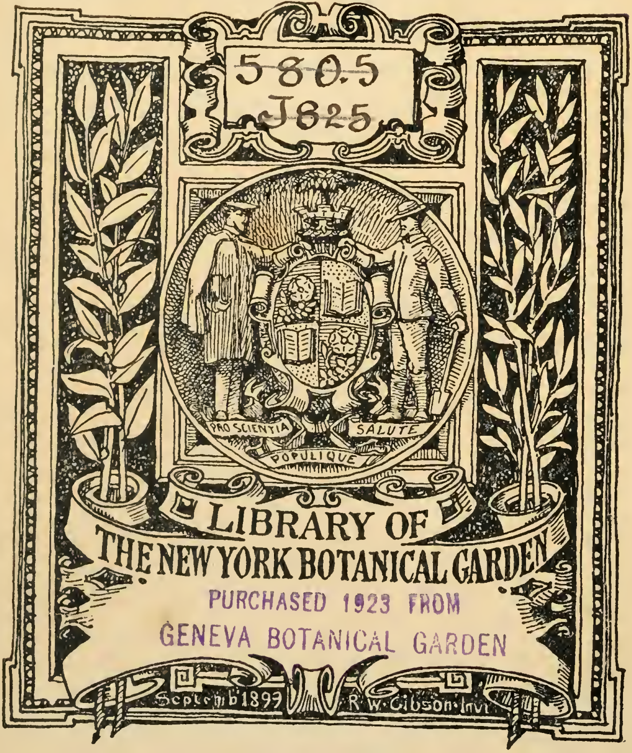

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THE

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ALGOLOGICAL NOTES—XVIII-XXIII.

By G. S. West, M.A., D.Sc., F.L.S.

XVIII.—Chlamydomonas microscopica, nov. nom.

In Note XIV of this series a new species of the Volvocaceæ was described under the name of *Chlamydomonas gracilis*.[*] I now find that the specific name "*gracilis*" has already been utilised for an entirely different species of *Chlamydomonas* by Snow in 1903.[†] Hence the minute species from Sutton Park, Warwickshire, requires another specific name, and I suggest *Chlamydomonas microscopica* as a suitable one. Snow's paper on the Plankton Algæ of Lake Erie was one of the few papers dealing with fresh-water phytoplankton that I had not seen, and it is through the kindness of Mr. F. S. Collins, of North Eastham, Mass., that I have at last obtained a copy of it.

XIX.—The Genus Protococcus *Agardh*.

Wille has recently shown [‡] that the genus *Protococcus* Agardh (1824) [§] stands on a firm basis and must be upheld. He has carefully examined Agardh's original specimens of *Protococcus viridis*, and has found them to be identical with the common Alga usually known as "*Pleurococcus vulgaris*," an Alga which Chodat [||] recently described under the name of *Pleurococcus Nägelii*. This note so recently published by Wille is of considerable general and taxonomic importance, since it finally decides that this exceedingly common Alga of damp temperate regions must in future be known as *Protococcus viridis*. Likewise it determines the scope of the family Protococcaceæ, which in the future cannot be used in the

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[*] G. S. West, "Algological Notes, XIV—XVII," Journ. Bot., March, 1915, p. 77.

[†] Julia W. Snow, "The Plankton Algæ of Lake Erie," Bull. U. S. Fish. Commission for 1902, Washington (1903), p. 388, t. 1, f. 1.

[‡] N. Wille, "Algologische Notizen XXII—XXIV," Nyt Magazin for Naturvidenskaberne, li, 1913.

[§] C. A. Agardh. *Systema Algarum*, Lundæ, 1824, p. 13.

[||] R. Chodat, *Algues Vertes de la Suisse*, Berne, 1902, p. 281.

sense of Oltmanns,* West,† Chodat‡ or Wille.§ It may seem undesirable to make a change of this kind, but the facts are perfectly clear and the change must be made.

The following can be regarded as well-established species of *Protococcus*:

1. *P. viridis* Agardh, 1824. [= *Pleurococcus vulgaris* auct. var.; = *Pleurococcus Nägelii* Chodat, 1902.]

2. *P. rufescens* Kütz. [= *Pleurococcus rufescens* (Kütz.) Bréb.]

3. *P. dissectus* Kütz. [= *Pleurococcus dissectus* (Kütz.) Näg.]

4. *P. Kützingii* (G. S. West). [= *Pleurococcus Kützingii* G. S. West in Journ. Bot., xlii, 1904, p. 287, t. 464, f. 9–10.]

5. *P. frigidus* (W. & G. S. West). [= *Pleurococcus frigidus* W. & G. S. West in Biol. Report of Brit. Antarctic Expedit. 1907–9, vol. i, part vii, 1911, p. 276, t. 24, f. 40–44.]

6. *P. antarcticus* (W. & G. S. West). [= *Pleurococcus antarcticus* W. & G. S. West, *l.c.*, p. 276, t. 24, f. 49–51; Fritsch in Biol. Report of National Antarctic Expedit. (Scott), vol. vi, p. 13.]

7. *P. fuscatus* G. S. West in Fuhrmann & Mayor, Voyage d'exploration scientifique en Colombie. Neuchatel, 1914, p. 1023, t. 21, f. 13.

The three following are species which are less well established:

8. *P. angulosus* Corda. [= *Pleurococcus angulosus* (Corda) Menegh.]

9. *P. pachydermus* (Lagerh.). [= *Pleurococcus pachydermus* Lagerh.]

10. *P. mucosus* Kütz. [= *Pleurococcus mucosus* (Kütz.) Rabenh.]

Many of the other supposed species of *Protococcus* have been found to belong elsewhere, and the remainder, whether described under that genus or under the generic name of "*Pleurococcus*," require further investigation.

XX.—ON A NEW MARINE GENUS OF THE VOLVOCACEÆ.

A sea-water tank used for experimental purposes by the Zoological Department of Birmingham University was noticed in April, 1915, to have developed a deep green colour. The tank was kept in the open air on the roof of the building and maintained its intense green colour until the middle of May. The water contained myriads of a species of *Chlamydomonas* and of another member of the Volvocaceæ which is not referable to any known genus of the family. The tank had been used for raising the larvæ of a certain species of crab. Originally it contained the crab ova, a number of stones to which were attached thalli of *Ulva Lactuca*, and several gallons of sea-water. All these came from Plymouth, and it is highly probable that the two members of the Volvocaceæ were present among the *Ulva*. The conditions in the tank were evidently extraordinarily favourable for the rapid increase of the two members of the Volvocaceæ.

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* F. Oltmanns, *Morphologie und Biologie der Algen*, Jena, 1904.

† G. S. West, *A Treatise on the British Freshwater Algæ*, Cambridge, 1904.

‡ R. Chodat, *Étude critique et expérimentale sur la Polymorphisme des Algues*, Genève, 1909.

§ N. Wille, "Chlorophyceæ und Conjugatæ in Engler and Prantl," *Die natürlichen Pflanzenfamilien*, Nachträge zu I Teil, Abteilung 2, Leipzig, 1909.

The new genus is described as follows :

Platymonas, gen. nov. Cellulæ vegetativæ minutæ, libere natantes et motiles, *valde compressæ* ; a fronte visæ ellipticæ vel subellipticæ, polo anteriori cum incisura aperta minuta et *cilios quattuor brevibus* prædito, polo posteriori rotundato vel acute rotundato ; a latere visæ subanguste oblongæ, polo anteriori subtruncato cum incisura minuta, polo posteriori leviter curvato et rotundato-conico ; a vertice visæ subrectangulares, angulis rotundatis et lateribus levissime concavis. Chromatophora singula, viride, cum lobis elongatis anterioribus 4 et lobis brevibus posterioribus 4, pyrenoide singulo partem posteriorem versus disposito ; nucleo singulo mediano ; stigma conspicua posteriori pyrenoidem proxima. Partitione prima cellulæ matricalis longitudinali.

P. tetrathele, sp. unica. (Fig. 1.)

Long. cell. 14–16 μ ; lat. cell. 7·5–8 μ ; cross. 4·2–5 μ ; long. ciliorum 9·5–12 μ.

Hab. In a tank of sea-water, which had been received from Plymouth, along with stones to which were attached fronds of *Ulva Lactuca*.

This organism is apparently a distinctive type of the subfamily Carteriæ of the Volvocaceæ. The cells vary a little in

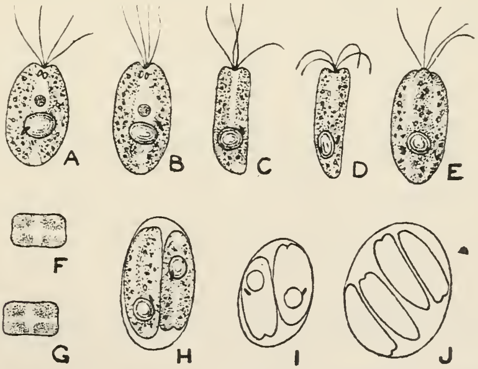

Fig. 1.—*Platymonas tetrathele.* A and B, broad aspect (front view) of the organism showing nucleus, pyrenoid, stigma and contractile vacuoles ; C and D, side views ; E, oblique view ; F and G, views of the organism seen from the anterior end (cilia not shown) ; H and I, division of cell to form two daughter-cells ; J, four daughter-cells formed within the mother-cell. All × 1000.

outward form, but on the whole they are somewhat irregularly elliptical in their broadest aspect. The posterior extremity is in many instances bluntly conical and the anterior extremity is conspicuously notched. The cell is much compressed and in its narrow aspect it is linear-oblong, with a subtruncate and slightly notched anterior extremity and a rounded-conical, slightly curved posterior extremity. This curvature of the tail in the narrow aspect was a constant feature of all individuals. A careful examination of the solid geometry of the cell shows that at the anterior end there is a notable depression which is surrounded by four mamillate projections (hence the specific name "*tetrathele*"), and it is from the base of this depression that the cilia arise. The four cilia are somewhat short, being only three-quarters the length of the body of the organism. The chloroplast is large and occupies most of the cell. It consists of four anterior lobes, each of which extends from one of the front mamillate projections to a point just behind the middle of the cell, where the lobes unite together. Four other shorter lobes then extend posteriorly. At the point of union of the lobes there is a large rounded pyrenoid, which is thus situated behind the middle region of the cell. There is a prominent pigment-spot (or stigma) adjacent to the pyrenoid. The nucleus is situated between the four anterior lobes of the chloroplast and immediately in front of the pyrenoid. Two small contractile vacuoles were present near the base of the cilia, but they could only be observed with difficulty.

The organism moves forwards with considerable rapidity and revolves at the same time. It performs one complete revolution in traversing a distance equal to three times its own length. Sometimes it stops its forward progression and begins to spin rapidly round "head over heels," so to speak; that is, the plane of revolution is longitudinal. This may be kept up for half a a minute, and then forward progression is renewed.

As a rule two daughter-cells are formed by the longitudinal division of the mother-cell. These face in opposite directions, and are at first enclosed in the old wall of the mother-cell. In very rare instances four daughter-cells arise in one mother-cell.

Platymonas belongs to the sub-family Carterieæ of the Volvocaceæ, and it is the second compressed genus of that sub-family which is now known. The other genus is *Scherffelia* Pascher.* *Platymonas* differs from *Scherffelia* in its less flattened cells, in its subrectangular cross-section without any lateral wings, in its four anterior mamillate projections, in its single lobed chloroplast furnished with a large pyrenoid, and in the posterior position of the stigma. *Platymonas* is also marine, whereas both known species of *Scherffelia* are fresh-water organisms.

XXI.—SOME FURTHER BRITISH SPECIES OF CHLAMYDOMONAS.

1. **Chlamydomonas brachyura**, sp. nov. Cellulæ vegetativæ (=zoogonidia) late ellipsoideæ cum polis leviter attenuatis, acutis

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* A. Pascher, "Zur Kenntnis zweier Volvokalen," *Hedwigia*, lii, 1912.

et similibus; verruca anteriori (=polo anteriori) minuta et acuta; chromatophora singula, magna, cellulam plerumque complente vel in polum posteriorem non extensa, cum pyrenoide singulo conspicuo mediano vel subanteriori; stigma carente. Propagatio: cellula matricalis ad duas directiones oblique longitudinales in quattuor dividit.

Long. cell. 12–16 μ; lat. 9–11·5 μ; long. ciliorum 19–21 μ. (Fig. 2.)

Hab. Among *Platymonas tetrathele* in a sea-water tank the contents of which came originally from Plymouth; May, 1915.

This species of *Chlamydomonas* occurred in great quantity, and is one of the few marine species of the genus. The stout character of the cells with symmetrically apiculate poles is a characteristic feature of the organism. The chloroplast is very massive and in many individuals appears to fill the entire cell from pole to pole. In other individuals the posterior pole is colourless and pellucid, the chloroplast being rounded off behind in a circular manner. There is one large pyrenoid, either median in position or disposed somewhat anteriorly. The chloroplast contains numerous small granules, and there is no stigma. The extension of the chloroplast to the extreme anterior end of the cell, with the consequent absence of a visible clear space in that region is somewhat unusual in species of *Chlamydomonas*.

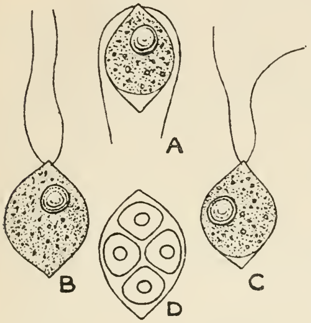

FIG. 2.—*Chlamydomonas brachyura.* A–C, vegetative cells; D, division of mother-cell to form four daughter-cells. All × 1000.

Chl. brachyura should be compared with *Chl. caudata* Wille and *Chl. subcaudata* Wille,* from both of which it differs in the shape of the cell-body, with symmetrical poles, in the nature of its chloroplast, in the position of the pyrenoid, and in the absence of a stigma.

2. CHLAMYDOMONAS PALATINA Schmidle, "Bemerkungen zu einigen Süsswasseralgen," Ber. Deutsch. Botan. Ges., xxi, 1903, p. 352, t. 18, f. 6, 7.

Long. cell. 14·5–24 μ; lat. cell. 12–18·5 μ; long. ciliorum 23–31 μ.

Hab. In a ditch at Harborne, Warwickshire (W. B. Grove, 1914).

This species does not appear to have been definitely recorded since its original description by Schmidle from ditches near Herxheim in Bavaria. The Harborne specimens agreed with those originally described in size, in relative length of cilia, in the absence of pyrenoids, in the absence of the stigma, and in the parietal, cushion-like disposition of the chloroplast. It is a large species and its movements are rapid. Daughter-cells were being formed in quantity, and the first division was invariably transverse. The first division-plane may be obliquely twisted so that the opposite ends of the daughter-cells sometimes overlap.

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* N. Wille, "Algologische Notizen IX—XIV," Nyt Magazin f. Naturvidenskab., xli, Christiania, 1903.

3. Chlamydomonas Holdereri Schmidle, "Einige von Dr. Holderer in Centralasien gesammelte Algen," *Hedwigia*, xxxix, 1900, p. 142.

Long. cell. 12·5–14 μ; lat. cell. 8–9 μ; long. ciliorum 21–24 μ. (Fig. 3.)

Hab. In a rain-water tub at Hereford (W. B. Grove).

This is another species so far not recorded since its original description. It occurred in immense quantity, and the characters of the Herefordshire specimens fit very well those described by Schmidle for *Chl. Holdereri*. The chloroplast is massive and hollowed, with a conspicuous pyrenoid in its posterior part. There is no stigma. The Alga was multiplying rapidly, and the first division of the mother-cell was in all cases longitudinal, although slightly oblique.

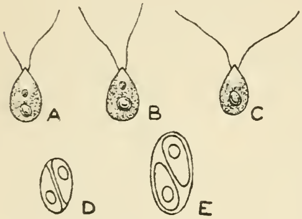

Fig. 3.—*Chlamydomonas Holdereri*. A–C, vegetative cells; D and E, division of mother-cell to form two daughter-cells. All × 500.

4. **Chlamydomonas Grovei**, sp. nov. Cellulæ vegetativæ (= zoogonidia) minutissimæ, globosæ vel subglobosæ; membrana sine verruca anteriori; chromatophora singula crateriformi, sine pyrenoide; stigma carente; nucleo singulo anteriori. Propagatio ignota.

Long. cell. 2·5–4·5 μ; lat. cell. 2·5–4 μ; long. ciliorum 6·5–10 μ. (Fig. 4.)

Hab. In water-butt, Studley Castle, Warwickshire (W. B. Grove; 1911; 1912); Cambridge (C. E. Moss; 1914).

It may seem undesirable to describe a new species of *Chlamydomonas* without knowing something definite concerning its reproduction, but the organism I have named *Chlamydomonas Grovei* does not agree with any other described species and most obviously belongs to the genus *Chlamydomonas*. Moreover, since it has been brought to me on three separate occasions it is a convenience to give it a definite name. The cells are almost spherical, with a parietal chloroplast hollowed out at the anterior end. There is no pyrenoid, and the nucleo is situated in the hollow of the chloroplast.

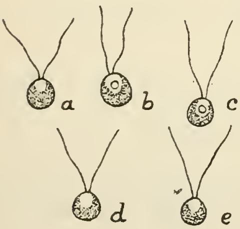

Fig. 4.—*Chlamydomonas Grovei*. Vegetative cells × 1000.

The Warwickshire specimens occurred in great quantity in a tub of rain-water for two consecutive years, and as brought to me were perfectly pure collections.

Chl. Grovei should be compared with *Chl. globosa* Snow (in Bull. U. S. Fish Commission, 1902, p. 389, t. 1, f. iii.), from which it is distinguished by its smaller size, the absence of a pyrenoid from the chloroplast, the absence of a stigma, and the proportionately longer cilia.

XXII.—ON TWO SPECIES OF PTEROMONAS.

In May, 1915, many specimens of a *Pteromonas* were observed from some small ponds near Berkswell in Warwickshire. These were carefully examined in the living state, and Dr. H. Takeda, who was then working in my laboratory at Birmingham, made excellent drawings of them. In September, 1915, Dr. Takeda collected specimens of a *Pteromonas* from Devonshire, and further specimens were also obtained from Ham Common in Surrey. He investigated these with great care and minuteness, with the result that it was found possible to discriminate between two species. One species is without doubt *Pteromonas angulosa* (Carter) Dang., first described by Carter under the name of *Cryptoglena angulosa*, but the other is apparently new, and since our knowledge of its distinguishing features is owing to the painstaking work of Dr. Takeda, it is here described as *Pteromonas Takedana.* I had on a previous occasion confused these species and figured the latter in Note XIII of this series* under the name of *Pt. angulosa.*

1. PTEROMONAS ANGULOSA (Carter) Dangeard in Le Botaniste, vi, 1899, p. 72; Lemm. "Beitrage zur Kenntniss der Planktonalgen V," Ber. Deutsch. Bot. Ges. xviii, 1900, p. 93. *Cryptoglena angulosa* Carter in Ann. and Mag. of Nat. Hist. ser. 3, vol. iii, 1859, p. 18, pl. 1, fig. 18 *a*, *b*, *c*. *Pteromonas alata* Cohn apud Seligo in Cohn's Beiträge zur Biologie der Pflanzen, iv, 1887, p. 170, t. 3, f. 42–45.

Long. cell. sine ala 12–14·5 μ, cum ala 15–17 μ; lat. cell. sine ala 8–10 μ, cum ala 15·5–17 μ; crass. cell. 8–9 μ. (Fig. 5.)

Hab. In ponds, Berkswell, Warwickshire (G. S. West and H. Takeda); in ponds, Ottery St. Mary, Devonshire (H. Takeda); Ham Common, Surrey (W. B. Turrill).

Carter's original description and figures of *Pt. angulosa* are by no means accurate, but there is no question that the specimens from the above-mentioned localities were referable to this species. Its chief characters are to be found in the shape of the cell apart from the outstanding membrane. In front view (fig. 5 A–D, *f*) the cell is rounded-pyriform, whereas in side view (fig. 5 A–C, *s*) it is deeply hollowed out in the middle of each side and also near the posterior and anterior extremities. There is also a wide toothed aperture of the external (outstanding) membrane. The vertical view (fig. 5 B, *e*) shows the same hollowed-out nature of the cell-margins. The massive chloroplast contains one pyrenoid of moderate size or very rarely two smaller pyrenoids (fig. 5 C). The stigma is conspicuous and situated slightly in front of the pyrenoid in a lateral position. The nucleus is in the anterior hollow of the chloroplast and approximately on a level with the stigma.

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* *Vide* Journ. Bot., Nov., 1912, p. 330, fig. 5, A and B (p. 331.)

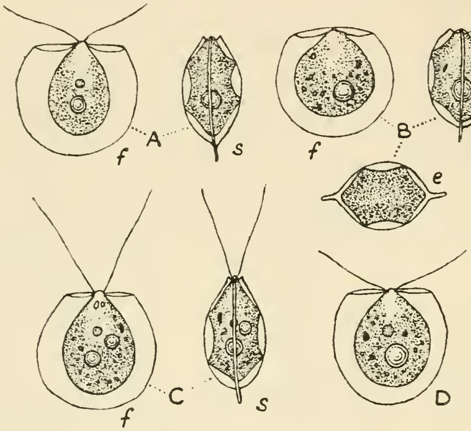

Fig. 5.—*Pteromonas angulosa.* Four specimens, × 1000. *f*, front view; *s*, side view; *e*, end view. In C the cell possesses two pyrenoids instead of one. (From drawings by Dr. H. Takeda.)

Teiling* has recorded "*Pteromonas angulosa* (Stein) Dang." from near Stockholm (in the plankton), but the brief note and the figure are insufficient to determine whether the Swedish specimens belong to this species or not. In all species of *Pteromonas* the lateral view of the cell is essential for correct specific determination.

Playfair† has recently described and figured "*Pteromonas alata* var. *australis* Playfair" from Lismore in N.S. Wales, but neither the description nor the poor figure is sufficient to be certain of its specific identity. He gives no cytological details, nor does he describe or figure the side view of the organism.

2. **Pteromonas Takedana** sp. nov. [= *Pt. angulosa* as recorded by G. S. West in Journ. Bot., vol. l, Nov., 1912, p. 330, fig. 5 A and B.]

A *Pt. angulosa* differt cellulis fere paullo majoribus, corpore intra membranam exteriorem a latere et a vertice viso elliptico et integro non excavato; pyrenoide singulo magno.

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* E. Teiling, "Schwedische Planktonalgen, I," Svensk Botanisk Tidskrift, Bd. 6, no. 2, 1912, p. 272. fig. 2.

† G. I. Playfair, "Freshwater Algæ of the Lismore District, etc.," Proc. Linn. Soc. New South Wales, xl, part 2, July, 1915. [N.B.—It is unfortunate that this author's work is not supervised. It is mostly superficial and very inaccurate in character. In the present paper he describes what appear to be the eggs of Tardigrades as new species of *Trochiscia*, a genus of the Protococcales which he places in the Fungi!]

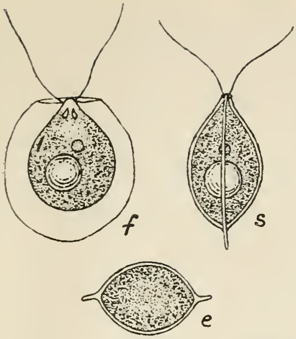

FIG. 6.—*Pteromonas Takedana*, × 1000. *f*, front view; *s*, side view; *e*, end view. (From drawing by Dr. H. Takeda.)

Long. cell. sine ala 15·5–16·9 μ, cum ala 20–22 μ; lat. cell. sine ala 12–13 μ, cum ala 17·5–22 μ; crass. cell. 8·2–10 μ. (Fig. 6.)

Hab. Earlswood Lakes, Warwickshire (G. S. West); Ham Common, Surrey (W. B. Turrill).

In the front view of the cell this species is scarcely to be distinguished from *Pt. angulosa* except by the larger size of the pyrenoid. In the side and end views, however, the body of the protoplast is seen to occupy the whole of the space within the external membrane and is not deeply hollowed as in *Pt. angulosa* (compare fig. 5 A–C, *s* and *e* with fig. 6, *s*. and *e*). The anterior aperture in the external membrane through which the cilia pass is also narrower and less toothed in the side view.

The figures of this species and of *Pt. angulosa* are all from drawings by Dr. H. Takeda, and I take this opportunity to thank him for courteously placing them at my disposal.

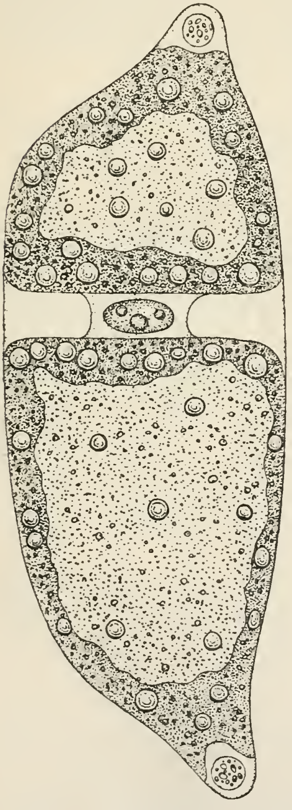

FIG. 7.—Involution form of *Closterium Ehrenbergii* with parietal chloroplasts, × 403.

XXIII.—AN ABNORMAL FORM OF CLOSTERIUM EHRENBERGII.

In the early part of May, 1913, numerous examples of *Closterium Ehrenbergii* were collected from small ponds in the vicinity of Berkswell, Warwickshire. These were placed, along with certain filamentous Chlorophyceæ, in a small culture-jar. In the course of a few weeks they had multiplied very greatly by cell-division, but as is so often the case in the rapid multiplication of unicells under unnatural conditions many monstrosities were produced. One of these, a short, stunted form, with curiously attenuated extremities, is worthy of special mention, since it possessed two *parietal* chloroplasts. In *Closterium Ehrenbergii*, as in other species of the genus, the chloroplasts are axile. In *Cl. Ehrenbergii*, Lutman[*]

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[*] B. F. Lutman, "The Cell-Structure of *Closterium Ehrenbergii* and *Closterium moniliferum*," Botan. Gazette, xlix, April, 1910.

has shown that they possess from twelve to eighteen longitudinal ridges. In the specimen here described and figured (fig. 7), quite apart from the deformity in the shape of the cell, the chloroplasts were of a very extraordinary character. Each one was a continuous parietal mass, with a plate-like extension across the median part of the cell, and therefore it formed the walls of a closed chamber containing a large sap-vacuole. In it were numerous scattered pyrenoids. No such chloroplasts have been previously observed in any species of *Closterium*, not even in a monstrosity. The nucleus was in its normal place and it contained three nucleoli. This monstrosity must be regarded as an involution form.

Various involution forms of *Closterium moniliferum* (Bory) Ehrenb., have been recorded by Andreesen,* as occurring in artificial cultures, although his monstrosities were more particularly plasmolysis-forms. The production of such forms is, however, common knowledge to those who have attempted cultures of Desmids under unnatural conditions. All Andreesen's monstrosities appear to have been pathological, and none showed any change in the nature of the chloroplast such as is here described for the abnormal form of *Closterium Ehrenbergii*.

NOTES ON SORBUS.

By the Rev. E. S. Marshall, M.A., F.L.S.

Dr. Hedlund, with whom the Rev. Augustin Ley had a considerable amount of correspondence, has kindly sent me two papers on *Sorbus* which deal with several plants found in Britain, and are therefore of interest to our botanists. *Sorbus*, though included under *Pyrus* in our lists and floras, is spoken of by Fries (Summa Veg. Scand., p. 173) as "*naturalissimi* hujus generis," and is retained in Nyman's *Conspectus*. It is difficult to see why this group should be ranged with the apples and pears, in view of their marked difference in flowers, fruit, and foliage.

By "homozygotic" and "heterozygotic"—terms not to be found in Dr. Daydon Jackson's *Glossary*—the author appears to mean plants derived from the same or from different groups; *S. Aria* × *S. Aucuparia* being quoted as an instance of a "planta heterozygotica."

I. De Sorbo arranensi Hedl. et affinibus homozygoticis Norvegiæ. Auctore T. Hedlund. Reprinted from *Ove Dahl: Botaniske Undersokelser i Helgeland*. II. (Videnskappsel-skapets Skrifter. I. M.-N. Kl. 1914. No. 4). Pp. 181–4.

A full description is given of *S. arranensis*, for which are quoted, as synonyms:—"*Pyrus scandica* Boswell (Syme), on the forms of *P. aria*, in Rep. Cur. Bot. Exch. Club, 1874–5: Journ. of Bot. xiii., p. 284 (1875). *Sorbus arranensis* Hedlund, Monogr. d.

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* A. Andreesen, *Beiträge zur Kenntnis der Physiologie der Desmidiaceen*, Jena (Gustav Fischer), 1909.

Gattung Sorbus [*l. c.*], excl. syn. *Pyrus fennica* Syme, nam haec species sec. specimina a Rev. Ley benevole communicata etiam in Arran occurrit." Dr. Hedlund continues [I translate, throughout] :—"It is a homozygotic plant, which, first discovered in Arran, is widely distributed in Norway (Grimstad, Dalen in Telemark, Strandebarm, Bindalen). The same form as that of Arran Isle, with whitish anthers, hardly 0·75 mm. long when dry, grows in Hardanger (Strandebarm). From this the form found in Helgeland (Bindalen) only differs by its anthers being pink before dehiscence, and up to 1 mm. long, as in *S. fennica* and *S. lancifolia*; this form may be named *neglecta*. *S. arranensis* differs from *Sorbus lancifolia*, Hedl., to which it comes nearest, chiefly by its broader and less deeply incised leaves . . ." A key (or conspectus) follows, giving the points of divergence between *S. Meinichii* Lindeb., *S. fennica* (L.) Fr., *S. lancifolia* Hedl., *S. arranensis* Hedl., *S. subsimilis*, *S. subpinnata* Hedl., and *S. intermedia* (Ehrh.) Pers.; of these only *fennica*, *arranensis*, and *intermedia* are known as British.

Three observations conclude this first paper, all of them dealing with plants of our own country.

1. "*S. minima* (Ley) Hedl. stands far apart from *S. lancifolia*, with which I at one time confounded it, and is better to be compared with *S. subsimilis*, from which it differs by its smaller and narrower leaves, usually acute or subacute, smallish flowers, small, whitish anthers, three styles [and] depressed-globose fruits, which are minute, and generally smaller than in *S. Aucuparia*."

2. "*S. subsimilis* reminds one in several points of *S. Mougeotii* Soyer-Will. & Godr.; but the latter, which is distributed through Central Europe, differs by its usually subacute leaves, with many lateral nerves, and its whitish anthers. Another homozygotic plant (*S. anglica* ad int., but not yet described), which grows in England, agrees with *S. subsimilis* in its pink anthers, and other points; but it diverges by the leaves being usually short-pointed, as a rule remarkably cuneate-based, sharply serrate towards the tip, with elongate serratures and more numerous lateral nerves, as in *S. Mougeotii*."

3. "All the Sorbi mentioned above, excepting *S. Aucuparia*, have irregularly developed pollen; thus answering to the heterozygotic plant *S. Aria* × *S. Aucuparia* (*S. quercifolia* hort.) and all its offspring. For other reasons, also, it is clear that these homozygotic plants, like most of those which grow in Europe, sprang from heterozygotic ones, propagating themselves in polyhybrid manner, in accordance with laws now well known. Their homozygotic nature appears from the very fact that in each region there occur plants of the same form; and, moreover, this has been very plainly proved by seed-propagation of *S. Meinichii*, *fennica*, *lancifolia*, *arranensis*, *subsimilis*, and *intermedia* (=*S. scandica* Fr.). All the species dealt with in the key (*S. Meinichii*, *fennica*, *lancifolia*, *arranensis*, *subpinnata*, *subsimilis*, *intermedia*) undoubtedly arose in this fashion, in Scandinavia, after the glacial period. Four of them, that is to

say, *S. lancifolia*, *arranensis*, *subpinnata*, *subsimilis*, seem to have originated in Norway. Then seeds of *S. arranensis* (the form with small and whitish anthers, which is well-distributed in Hardanger), may have been carried by birds in winter-time to the Scottish island of Arran. That this was the case is confirmed by the fact that *S. fennica*, which is widely distributed in Norway, likewise occurs in the same island. It should be added that *Sorbus intermedia*, which occurs so frequently in Smolandia (Sweden), especially eastwards, and (according to E. Fries) forms many small woods there, that it may be assumed to have originated here, and spread hence, has lately been detected in Scotland, according to specimens kindly communicated by Rev. A. Ley. In 1909 six trees of this species were found by Rev. E. S. Marshall and Dr. Shoolbred near a stream at Garve, E. Ross-shire, Scotland [see Journ. Bot., 1910, p. 134, E. S. M.]; and they were jointly of opinion that the biggest tree was a hundred years old. As *S. intermedia* has only been cultivated in England and Scotland lately [temporibus ultimis], it is easily understood that these trees grew from seeds brought by birds from Scandinavia."

It has been asserted that birds normally migrate *fasting*; and, although *Sorbus*-fruits may take a considerable time to digest, and the seeds may be retained still longer, before being voided, yet the British distribution of *S. arranensis* and *S. fennica* (only in the *western* Isle of Arran) presents a further difficulty.

According to Nyman, *Cratægus scandica* L. am. ii. is a synonym of *S. scandica* Fr.; and this may make the name *S. intermedia* Pers. (*Pyrus intermedia* Ehrh.) invalid.

II. SORBUS NORVEGICA Hedl. nov. nomen. Syn. *Pyrus Aria α obtusifolia* De Candolle, Prodr. ii. p. 636, pr. p. (Fl. Dan. 302, pr. p. *S. rupicolam* respicit) 1825. *Sorbus* (*Aria*) *obtusifolia* Hedl., Monogr. d. Gattung Sorbus (Kongl. Sv. Vet. Akad.: s. Handl. Bd. 35, N : o 1, p. 80), 1901, nomen jam antea variis *Sorbis* attributum. Reprinted from *Nyt Magazin for Naturvidenskabene*, Band 52, H. 3 [1914], pp. 255–9.

S. norvegica Hedl. is fully described. "Its distribution is mainly in Southern Norway, more rarely in Bahusia (Sweden), and it was formerly reported from Gotland and Lilla Karlso: apparently it is absent outside Scandinavia. Differs from the subsimilar forms of *S. Aria*, especially by the irregularly developed pollen, as is the case in the heterozygotic plant *S. Aucuparia* × *S. Aria*. It should be most closely compared with *S. porrigens*, n. sp., not yet described, which is distributed through Central Europe from Asia to England. *S. porrigens* differs from *S. norvegica* in the smaller leaves, shortly obovate, more decidedly cuspidate, with the serratures of the upper third of the leaf very often strongly porrect. I have seen specimens from Asia Minor: Paphlagonia (*P. Sintensis*, Iter Orientale, 1892, No. 5128, pr. p.; the specimens belong in part to *S. græca*); Balkan: Akdagh

(*Manissadjian*, Plantæ Orientales, 811); Hungary: Waters of Hercules (*L. Richter*); Moravia: Polau Mountains (*Heinr. Laus*); Germany: near Landskrone in the Ahrtal Valley, Rhine Province (*Sehlmeyer*); S. England: N. Somerset, Brecon, Cheferton [? Chepstow], Monmouth, Hereford, Radnor (*Aug. Ley*). *S. græca* Lodd. differs in its leaves—the same size as in *S. porrigens*—being roundish, obtuse or obsoletely cuspidate, with short serratures and fewer lateral nerves. Further removed is *Sorbus rupicola* (= *Pyrus rupicola* Syme, Sowerby's Engl. Bot. ed. 3, iii. p. 244, 1864; *Sorbus salicifolia* (Myrin) Hedl. Monogr. d. Gatt. Sorbus, p. 78, 1901) by its obovate or obovate-oblong leaves, quite entire in their lower third or quarter, with short and broad serratures, the lateral nerves usually about eight, the sepals patent in flower, but not reflexed, the fruits larger (up to 12·75 mm. long and 14·5 mm. broad) and darker red. . . . In South Sweden (Kullen, in Scania) only *S. rupicola* is present; but I have neither seen this nor *S. norvegica* grown in gardens."

S. subsimilis Hedl., n. sp., is described at length. The author goes on to say:—"This is certainly a homozygotic plant, not yet observed outside Norway, where it occurs chiefly in Sogndal, and is there fairly frequent in several places. In several points it agrees with *S. Mougeoti* Soyer-Will. & Godr., distributed through the hilly parts of Central Europe; but it differs in the very blunt leaves, broadly cuneate at the base [in *S. Mougeoti* the leaves are of the same shape at the apex and the base], less densely tomentose beneath, and with rather fewer lateral nerves, the remarkably sweet fruits, quite naked (not cæsio-pruinose) when dry, the anthers more or less pink-tinged before dehiscence, rarely somewhat whitish.

"Another homozygotic plant, *S. anglica*, n. sp., or subsp. of *S. Mougeoti*, occurring in England, which is not yet described, agrees with *S. subsimilis* in its pink anthers and other points, but diverges by the leaves being as a rule shortly acute, sharply serrate towards the tip, with elongated serratures, more densely tomentose beneath, with more numerous lateral nerves, as in *S. Mougeoti*, and the fruits being usually a little cæsio-pruinose."

S. anglica, which at one time was supposed to be *Pyrus intermedia*, grows not uncommonly in the Wye Valley (34 W. Gloster, 35 Monmouth, 36 Hereford); I have a sheet from Craig Cille, 42 Brecon, collected by Mr. Ley, who also pointed out to me a tree in Cheddar Gorge, 6 N. Somerset (June, 1906). It appears to be restricted to the mountain limestone. A specimen which I gathered near the foot of the Wynd Cliff (35) in 1895 has been referred by Dr. Hedlund to *S. anglica* × *latifolia*; no inflorescence was seen, but the foliage is intermediate, and the putative parents grew near it. He also gave this name to Mr. Ley's "*Pyrus rotundifolia* Bechst., var.," from woods near Symond's Yat, 34 (1899), and his "*P. scandica* Asch." (a very different looking plant), from Cefn Fedw, 50 Denbigh (1901); as well as to Mr. J. W. White's "*P. latifolia* Syme" from Leigh Wood, 6 (1905).

It may be useful to add a few other notes on specimens in my herbarium; Dr. Hedlund's opinions (or suggestions), received through Mr. Ley, do not appear to have been published.

S. Aria × *torminalis*. Symond's Yat, 34 (1901)! Gathered, in company with Mr. Ley, as *Pyrus latifolia* Syme. Bicknor Rocks, 34 (October, 1892), *A. Ley*: "Ripe fruit dry, mealy; varying from pale orange to light red." Apparently quite fertile.

S. minima × *latifolia*? Watersmeet, 4 N. Devon (June, 1906), *A. Ley*. Gathered for *P. latifolia* var. *decipiens* (Bechst.). Certainly not the Minehead (5 S. Somerset) plant, so named; there is a decided look of *minima* about it. Mr. Ley told me that this station produced a number of curious forms; but *S. minima* is hitherto only recorded from Brecon.

S. salicifolia [now changed to *S. rupicola*] × *torminalis*. Cefn Coed, 42 Brecon (June, 1899), *A. Ley*. Issued as "*Pyrus scandica?*"; Professor Koene believed it to be typical *Aria succisa* Koene. See B. E. C. Report, 1899, p. 605. The same hybrid, "nearer *S. torminalis*," from limestone cliffs, Dan-y-Graig, 41 Glamorgan (May 28th, 1896), *A. Ley & W. A. Shoolbred*. Koene considered this to be his *Aria suecica*, typical (= *Cratægus Aria* L. var. *suecica* L. = *Pyrus intermedia* Ehrh. = *P. decipiens* Bechst. = *Sorbus scandica* Fr.). It is certainly not the same as what Dr. Hedlund names *S. scandica*. See Journ. Bot. 1897, pp. 99-100.

S. incisa (Reichb.). Limestone rocks, a little north of Weston-super-Mare, 6 N. Somerset (June, 1909)! Ref. No. 3401. Dr. Hedlund's note was as follows:—"*Sorbus incisa* (coll.). (*S. incisa* consists of several incipient species [Elementararten], which are not easy to separate)." With this, which has lanceolate to oval-lanceolate foliage, grew a very different plant (No. 3400), much nearer to one of Mr. Ley's from Cheddar Gorge (1909), accepted by Dr. Hedlund as *Pyrus Aria* Ehrh. var. *incisa* (Reichb.); but the latter has the leaves truncate-based, whereas in my No. 3400 they are broadly cuneate, and subentire in their lower third or quarter. Both have roundish foliage. I think that the bulk of what we have hitherto regarded as typical *Pyrus Aria* Ehrh. will prove to be *Sorbus porrigens* Hedl., not yet described.

Evidently much further study of the British *Sorbi* is needed. Dr. Hedlund's address is Alnarp, Akarp, Sweden.

CAREX PSEUDO-PARADOXA *S. GIBSON*.

By C. E. Salmon, F.L.S.

This plant has been lost sight of in recent years amongst British botanists, owing to its confusion with *C. teretiuscula* forms, and I have recently looked up the following details.

Samuel Gibson (1790?–1849), in the *Phytologist* (i, 778, 1843), gave the name *Carex Pseudo-paradoxa* to plants which had been sent him on two different occasions as *C. teretiuscula* and *C. paradoxa*, but which, to him, clearly differed from both. He very carefully described his new *Carex*, and was particular to call attention to its divergences from both the above-mentioned species, but, curiously enough, omitted all reference to *C. paniculata* in this initial account.

The announcement of the new plant brought forth spirited criticisms in the same journal from Dr. J. B. Wood, G. Luxford, J. Sidebotham, and others; and much was written, in the somewhat forceful and often personal manner of the day, to show that Gibson's plant was nothing but a form of *C. teretiuscula*. This opinion was vigorously opposed by Gibson in a careful note (*op. cit.* 1038, 1844), in which he contrasted his plant with all the allied species, including *C. paniculata*.

Here the matter seems to have been left, Babington (Man. ed. 2, 357, 1847, and all subsequent editions), Hooker (Stud. Fl. 408, 1870, and editions following), Syme (Eng. Bot. ed. 3, 88, 1870), and others placing Gibson's plant as synonymous with *C. teretiuscula* Good. var. *Ehrhartiana* Hoppe. Richter (Pl. Europ. i, 149, 1890), however, places *Pseudo-paradoxa* as a variety under true *C. paradoxa* Willd., a position it cannot possibly occupy.

Botanizing in a fascinating swamp near Restennet Farm, Forfar, with Mr. E. G. Baker, in July, 1912, we saw in plenty a *Carex* that, at first sight, led us to believe we had indeed discovered *C. paradoxa* in Scotland. A closer examination decided that such a decision could not stand, and *C. Pseudo-paradoxa* of Gibson seemed the only possible solution.

The habit and size of the whole plant were completely those of *C. paradoxa*, but it had not the peculiar frayed sheaths at the base of the stem, which Mr. Arthur Bennett tells me is a character he has never known to fail, although it is not shown in the Eng. Bot. drawing, nor was the perigynium suddenly contracted into the beak as in *paradoxa*; moreover, the beak was strongly winged. Neither could the plant be put under *C. teretiuscula*, which grew with it in the same marsh and was abundantly distinct by its more slender habit, spike-like panicle, less ribbed perigynium, etc.

All the minuter details of the inflorescence pointed to *C. paniculata*, and I recalled Gibson's preliminary mention of his plant as a variety of *C. teretiuscula* (*op. cit.* 366, 1842), where he says that its "fruit" * [agrees] with Leighton's figure of the fruit of *C. paniculata*."

It then became necessary to examine the ripe nuts of the Restennet plant and those of its near allies, with the following results:—

C. teretiuscula. Nut brownish, broadest above the middle, pyriform; base of style scarcely thickened. The figure of the nut in Leighton's *Flora of Shropshire*, p. 454 (1841) is much more accurate, I should say, than that in Eng. Bot. ed. 3, t. 1619, but both are inferior to the beautiful drawing by Sir W. O. Priestley (1829–1900) in the British herbarium of Herb. Mus. Brit.

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* Gibson used the word "fruit" to designate the *nut*, not the perigynium.

C. paradoxa. Nut yellowish, broadest at or below the middle, almost as broad as long; base of style slightly thickened. Its broader outline, as compared with that of *paniculata*, is well shown in Schkuhr, *Riedgräsern*, t. cclxxxvi, E, No. 21 (1801), but is surpassed by Sir W. O. Priestley's admirable and accurate dissections.

C. paniculata. Nut brownish, broadest below the middle, about twice as long as broad; base of style as in the last. I have been unable to find in perigynia from various parts of Britain any nuts showing such an enlarged base to the style as is figured by Leighton (*l. c.*) which is, if anything, more exaggerated in Eng. Bot., ed. 3, t. 1622.

C. Pseudo-paradoxa. Nut identical with the last.

If, then, Gibson's *Pseudo-paradoxa* is a distinct form or variety and has nothing to do with states of *C. teretiuscula*, how can we account for the very diverse views expressed in the *Phytologist* ?

I believe the explanation is that Gibson was describing a different plant from that discussed by the other contributors to the *Phytologist*, and that both the form of *C. teretiuscula* known as var. *Ehrhartiana* Hoppe and also this *Pseudo-paradoxa*, obviously related to *C. paniculata*, grow in the same locality, Seaman's Moss-pits, Cheshire. This theory is strengthened when one finds this station given for *C. paniculata* in De Tabley's Fl. Cheshire, 322 (1899); and I have in my herbarium examples of *C. teretiuscula* var. *Ehrhartiana*, similarly localised, collected by Mr. S. H. Bickham in 1868.

Gibson (*op. cit.* 779) states that his plant also occurs plentifully by the sides of Malham Tarn, near Settle, and on the strength of this statement the locality is entered in Lees' Fl. W. Yorks., 460 (1888), but under *C. teretiuscula* var. *Ehrhartiana*.

It may be well to give here Gibson's original description of *C. Pseudo-paradoxa* and also the diagnosis of Ascherson and Graebner, who have taken up the plant as a variety. The former runs: "*Carex Pseudo-paradoxa.* Spikes panicled, branches approximate; perigynium ovate, gibbous, acuminated into a serrulate bidentate beak, more or less plano-convex, with seven nerves on the convex side (three very slender in the middle and two strong ones on each side of them), the outer nerves, or those nearest the margins, being very short; nut rhomboidal, narrowing from below the middle; style enlarged at the base; stem three-angled, angles rough on the upper part; leaves narrow, rough on their edges. This plant differs from *C. teretiuscula* in having its spike more distinctly panicled, in its nut being narrowed upwards from below the middle, and in its style being thickened at the base; in *C. teretiuscula* the style is not thickened at the base, and the nut is pyriform, narrowing downwards from above the middle. . . . *C. paradoxa* may at once be distinguished from this plant [*Pseudo-paradoxa*] by its perigynium, which is more gibbous, and has about nine nerves on the convex side and seven on the other."

The following is a translation from Ascherson and Graebner (Synops. Mitteleurop. Flora, ii, 2, 46 (1902)): B. *pseudo-paradoxa*

Stem thinner and more delicate. Inflorescence not paniculate, even the lower spikelets short and upright. Rare. *C. paniculata* var. *pseudo-paradoxa* A. & G. Syn. ii, 2, 46 (1902). *C. Pseudoparadoxa* Gibs. Phytolog. i, 7, 178 (1844) [i, 778, 1843]. Nyman Consp. 781. *C. paniculata* b. *tenuior* Grantzow Fl. Uckerm. 309 (1880). *C. paradoxa* b. *pseudoparadoxa* Richter Pl. Eur. i, 149 (1890). *C. paniculata* var. *simplex* Uechtritz Herb."

As regards the variety *tenuior* mentioned above, the reference should read "Sond. ex Grantzow"; of this I have been unable to see a type specimen, but in Herb. Brit. Mus. is an example labelled "f. *tenuior* Grantzow" (A. v. Hayek, Fl. Stir. exsicc. 15 lief., 725, 1909), which seems identical with Gibson's plant.

From the above it would appear that the plant may be separated from *C. paniculata* as a variety by the following characters:

Var. PSEUDO-PARADOXA (S. Gibs.). Whole plant more delicate and graceful, not forming immense tussocks; stems 3½–5½ decm. high; leaves narrower, 2½–3½ mm. broad; inflorescence simulating that of *C. teretiuscula* or with short erect branches as in *C. paradoxa*.

Gibson (*op. cit.* 1044) mentions a difference in the perigynium, but I have not been able to confirm this.

EAST WILTSHIRE MOSSES.

By C. P. Hurst.

Not very much is known of the bryology of Wiltshire, the mosses of North Wiltshire having been especially neglected. Mr. H. N. Dixon has published a very interesting paper, entitled "The Moss Flora of the Marlborough Greywethers" (*v.* The Wiltshire Archæological and Natural History Magazine, vol. xxxv, p. 587–590, December, 1908), and Mr. A. B. Jackson has contributed Records for North Wiltshire to the *Census Catalogue of British Mosses* (1907), while Miss E. Armitage and Mr. J. Saunders have supplied records for South Wiltshire to that publication.

The following mosses have been collected mostly in Savernake Forest, Marlborough, and around the border village of Great Bedwyn, which lies to the south-east of Savernake Forest and not very far from the county boundary between Wiltshire and Berkshire. The Kennet and Avon Canal dividing Wiltshire into the vice-counties of North Wiltshire (7) and South Wiltshire (8) passes through Great Bedwyn. The soil is chalk, with Eocene outliers consisting of Reading Sands capped with London Clay; a bryological drawback is the absence of rocks, sarsen stones being rare. The occurrence of *Grimmia trichophylla*, *Grimmia subsquarrosa*, *Hedwigia ciliata*, and *Orthotrichum rupestre* on sarsen stones near Aldbourne is interesting; these stones are nearly eight miles north-east of the Marlborough Greywethers. *Grimmia subsquarrosa* and *Ulota Hutchinsiæ* are additions to the Wiltshire sarsen stone moss flora; they, like a number of the species recorded by Mr. Dixon in his paper on the Marlborough Greywethers, are siliceous rock-loving species very much out of place on chalk downs, and their localities on the highly siliceous sarsen stones near Marlborough and Aldbourne are outlying stations. According to the *Census Catalogue*, the nearest stations for *Grimmia subsquarrosa* are in the counties of Hereford and Worcester, while to gather *Ulota Hutchinsiæ* one would have to go as far afield as Carmarthen and Devon. Both mosses are recorded from Cornwall, and Mr. Dixon considers that the spores of these aberrant sarsen stone species were in all probability "in most cases carried by westerly winds from the granite rocks of the Cornish peninsula in comparatively recent times."

Savernake Forest is not so remarkable for rare species as for certain mosses which, generally rare in fruit, are found in that condition within its boundaries; by the side of a gravel path in the north-eastern part of the Forest, *Brachythecium purum* fruits freely for a considerable distance, and with or near it grow *Brachythecium illecebrum*, *Hypnum Schreberi*, *Hylocomium splendens*, and *Hylocomium squarrosum*, all with capsules, while *Zygodon viridissimus*, *Neckera pumila*, *N. complanata*, *Pterogonium gracile*, *Eurhynchium Swartzii*, and *E. pumilum* are also mosses that I have found fruiting within this sylvan tract. *Philonotis calcarea* var. *laxa*, growing by the sides of the Kennet and Avon Canal between Great Bedwyn and Hungerford, is a new variety. Other features in the list are *Leptodon Smithii* on a beech in the Grand Avenue, Savernake Forest (this fills up a gap in the distribution of this species); the flowering *Philonotis cæspitosa*, in two bogs near Great Bedwyn; and the occurrence of interesting forms of *Webera annotina* and *Hypnum riparium* at Dod's Down Brickworks and Wilton Water.

The nomenclature and arrangement of the *Census Catalogue* have been followed. I have included in the list those species in Mr. Dixon's paper already mentioned, which are new vice-county records for v.-c. **7**. The number or numbers appended to each moss indicates the vice-county or vice-counties in which it has been observed. I have to acknowledge much kind help and notes from Messrs. H. N. Dixon, H. H. Knight, and W. R. Sherrin. The list contains over eighty Wiltshire new county records and shows how prolific a small area may be, if carefully examined.

7 = North Wiltshire. **8** = South Wiltshire. c.fr. = With fruit. * = New vice-county record.

Polytrichum nanum Neck. **8**. Sparingly on London Clay at Dod's Down Brickworks, near Great Bedwyn.

P. aloides Hedw. **7***, **8**. Savernake Forest; on London Clay at Dod's Down Brickworks, near Great Bedwyn.

P. urnigerum L. **7***, **8**. Plentifully in the north-eastern part of Savernake Forest; on London Clay at Dod's Down Brickworks, near Great Bedwyn.

P. juniperinum Willd. **7***. Near Marlborough (H. N. Dixon).

P. formosum Hedw. **7***. Common in Savernake Forest.

P. commune L. **8**. On London Clay at Dod's Down Brick-near Great Bedwyn.

Pleuridium axillare Lindb. **7***, **8***. Plentifully round a pool near the Column in Savernake Forest; near Burridge Heath, Great Bedwyn, in two localities.

P. subulatum Rabenh. **7***. Savernake Forest.

Ditrichum flexicaule Hampe. **7, 8**. Savernake Forest, near Eight Walks; on the downs near Tidcombe.

Dicranella heteromalla Schp. **7, 8**. Very common; a curious starved and stunted form, probably due to the drought of the very hot summer of 1911, was found near Burridge Heath, Great Bedwyn, v.c. **8**. "According to Mrs. Britton this is practically the same as the xerophytic North American form or depauperate state that Cardot called *D. Fitzgeraldi*, and is the var. *orthocarpa* (Hedw.) Paris." *Dixon.*

D. cerviculata Schp. **8**. On London Clay at Dod's Down Brickworks, Great Bedwyn.

D. rufescens Schp. **8***. On London Clay at Dod's Down Brickworks, Great Bedwyn.

D. varia Schp. **7***, **8**. Common.

Dicranoweisia cirrata Lindb. **7, 8**. Common on thatch and palings, and also on trees.

Campylopus flexuosus Brid. **7***. Various localities in Savernake Forest.

C. pyriformis Brid. **7***, **8***. Various localities in Savernake Forest; Bedwyn Brailes Wood. I think I have seen fruit in Savernake Forest.

Dicranum majus Turn. **7***. Very fine in Savernake Forest.

Leucobryum glaucum Schp. **7***. Conspicuous and plentiful in Savernake Forest near the Column, also elsewhere near Savernake Forest.

Fissidens adiantoides Hedw. **8**. Wet place near Folly Farm, Great Bedwyn; c.fr.

Grimmia apocarpa Hedw. **7***, **8**. Clatford Bottom, near Marlborough (*Dixon*); wall, Great Bedwyn.

G. trichophylla Grev. **7**. On sarsen stones near Aldbourne.

G. subsquarrosa Wils. **7***. On sarsen stones near Aldbourne; also on the Marlborough Greywethers.

G. leucophæa Grev. **7**. On several sarsen stones in Lockeridge Dean; this is additional to Mr. Dixon's station in Clatford Bottom.

Rhacomitrium heterostichum var. *alopecurum* Hübn. **7***. A small quantity on one rock, near the Ridgeway, above Clatford Bottom, Marlborough. (*Dixon.*)

R. canescens Brid. **8***. Botley Down, near Great Bedwyn, extending for some distance on the top of the escarpment towards Rivar Hill.

Hedwigia ciliata Ehrh. 7*. Sarsen stones near Aldbourne; frequent on sarsen stones near Marlborough (*Dixon*).

Phascum Floerkeanum Web. & Mohr. 8*. Common in a chalky field at Northhill Barn, near Marten.

Pottia recta Mitt. 8*. Chalky field at Northhill Barn, near Marten.

P. truncatula Lindb. 7*, 8. Common.

P. intermedia Fürnr. 7*, 8*. Cobham Frith Wood, near Bedwyn Common; near Wilton Brailes Wood.

P. minutula Fürnr. 7, 8. Abundant in a chalky field at Northhill Barn, near Marten.

Tortula mutica Lindb. 8. On a tree in the village of Burbage, near Savernake; it grows at the base of the trunk; higher up the tree is found *Tortula papillosa* Wils.

T. laevipila var. *lævipilæformis* Limpr. 7*. On Elder, Beckhampton, about seven miles west of Marlborough; c.fr. Well marked and with the foliose gemmæ (*Dixon*).

T. intermedia Berk. 7*, 8. On a sarsen stone near Marlborough (H. N. Dixon); a form occurred on a roof at Shalbourne, near Great Bewyn, v.c. 8, which Mr. Dixon considered showed an approach to the South European arboreal moss, *Tortula pulvinata* Jur. He wrote concerning it: "I have heard from Mr. W. E. Nicholson about the *Tortula*: he finds the plant an abnormal one, and while the weaker leaves show a nerve section very much like *T. pulvinata*, he thinks they do not quite agree, and as the better developed ones distinctly approach *T. intermedia* Berk. in the nerve structure, though not quite so fully developed in the stereid band, he thinks it should be referred there, and I think that is the correct view."

T. ruralis. 7*, 8. Common.

T. papillosa Wils. 8*. On a roof at Shalbourne near Great Bedwyn; on a tree trunk in the village of Burbage, near Savernake.

Barbula cylindrica Schp. 7, 8*. Rather common; fruiting on a wall at Durley, near Savernake; near Wolfhall.

B. vinealis Brid. 7, 8*. Common on walls; on the south side of the bridge over the Kennet and Avon Canal in Great Bedwyn village.

B. sinuosa Braithw. 7*, 8. "In two or three localities, sparingly," near Marlborough (*Dixon*); on a sarsen stone at Little Bedwyn.

B. Hornshuchiana Schultz. 7*, 8*. Rather common in and around Great Bedwyn; very fine at Dod's Down Brickworks, where, I think, I have seen fruit.

B. revoluta Brid. 7*. Common; on a wall at Ramsbury.

B. convoluta Hedw. 7*, 8. Common.

B. convoluta var. *Sardoa* B. & S. 7*, 8*. Near Marlborough (*Jackson*); near Aldbourne; Chisbury; wall at Fosbury Manor.

Weisia crispa Mitt. 8*. Near Oakhill Wood, Fosbury.

W. viridula. Hedw. 8. On Upper Greensand at Shalbourne, near Great Bedwyn; not common in the district.

Cinclidotus Brebissoni Husn. **7***. On a stone by stream, near Lockeridge, Marlborough (*Dixon*).

C. fontinaloides P. Beauv. **7**, **8**. Aldbourne; by the south side of the Kennet and Avon Canal, not at all common.

Encalypta vulgaris Hedw. **8***. Near Tidcombe, growing by the roadside on the county boundary; c.fr.

E. streptocarpa Hedw. **7***. Mortar of stonework, Bowood Park, near Calne (*Dixon*).

Zygodon viridissimus R. Br. **7**. Fruiting on old elder and oak in various parts of Savernake Forest; I have seen an oak trunk one side of which was covered with it fruiting quite profusely.

Ulota crispa Brid. **7***. Rather common.

U. Hutchinisæ Hamm. **7***. Upon a sarsen stone on Fyfield Down, near Marlborough.

Orthotrichum rupestre Schleich. **7**. On sarsen stones near Aldbourne; c.fr.

O. anomalum var. *saxatile* Milde. **7***, **8**. On a wall in Great Bedwyn village; on the south side of the Kennet and Avon Canal.

O. Lyellii Hook. & Tayl. **7**, **8**. Fruiting on a beech in the Grand Avenue, near Dod's Down Brickworks, Bloxham Copse, etc.; a rather common moss.

O. tenellum Bruch. **7**. On an elm at Bedwyn Common.

O. pulchellum Smith. **7***. Rare; on a shrub overhanging a rivulet at Chilton Foliat; on elder near Cobham Frith Wood, Great Bedwyn; in small quantity in both localities.

Physcomitrium pyriforme Brid. **8**. Around a pool on Murrel Down, Great Bedwyn.

Funaria hygrometrica Sibth. **7***. Near Marlborough, Savernake Forest, etc.

Aulacomnium androgynum Schwaegr. **8***. On a sandy bank near Hamspray House, Ham, about five miles from Great Bedwyn.

Philonotis fontana Brid. **7***, **8**. Near Hopgrass Farm, Hungerford; plentifully in a marshy depression near Shalbourne Newtown, Great Bedwyn, where one capsule was found; also in Bedwyn Brailes Wood.

P. cæspitosa Wils. **8***. Bog near Burridge Heath, Great Bedwyn, with male flowers which appear in May and June; also in a marshy place near Shalbourne Newtown, with male flowers, growing with *P. fontana*.

P. calcarea var. *laxa* nov. var. Dismier MS. in litt. **7***, **8***. Both sides of the Kennet and Avon Canal between Hungerford and Great Bedwyn. "A variety, parallel to the similarly named vars. of *P. fontana*, *P. cæspitosa*, etc. The nerve, muricate at back, is a noticeable feature in this gathering, apart from the lax areolation."—*Dixon*.

Webera annotina Schwaeg. **8***. An interesting form occurred on London Clay near Dod's Down Brickworks, Great Bedwyn, about which Mr. Dixon wrote as follows: "Your *Webera* is for the most part normal *W. annotina* (bulbils small and numerous in each leaf axil, mostly about the top of the stem). A few stems have the *W. erecta* form, bulbils few, large, single in a leaf axil, with the leaf pushed outwards, mostly in the middle of the stem. But these are rather smaller than in *W. erecta*, the leaves are identical with those of the other stems; and, moreover, there are several stems with the normal *annotina* bulbils, but with one or two of the larger single ones lower down; showing, I think conclusively, that all are forms of one plant, not two species or vars., intermixed. It throws a rather interesting light on *W. erecta*, however, I think."

W. albicans Schp. **7***, **8***. Chisbury; with male flowers, near Eight Walks, Savernake Forest; roadside near Ham.

Bryum pallens Sw. **7***, **8**. On the north and south sides of the Kennet and Avon Canal; c.fr., at Dod's Down Brickworks, near Great Bedwyn, where it grows with the hepatic *Blasia pusilla*.

B. pseudo-triquetrum Schwaeg. **8**. Wet place near Folly Farm, Great Bedwyn.

B. intermedium Brid. **8***. On wet clay near Burridge Heath, Great Bedwyn.

B. cæspiticium L. **7***. Walls, etc.

B. murale Wils. **7***, **8***. On wall near Hatchet Lane, Great Bedwyn; on railway bridge near Wolfhall.

Mnium cuspidatum Hedw. **7***. Savernake Forest.

M. rostratum Schrad. **8**. In a wet place near Shalbourne.

Fontinalis antipyretica L. **7***. On a stone by stream, near Lockeridge, Marlborough (*Dixon*); in the River Kennet at Ramsbury.

Cryphæa heteromalla Mohr. **7**. On trees, especially old elder and hazel, widely spread but uncommon, Ramsbury, Wilton Brailes Wood, etc., on a beech near Grand Avenue, Savernake Forest.

Neckera pumila Hedw. **7***. Common in Savernake Forest, where the fruit is rare; I have found fruit in various localities.

N. pumila var. *Philippeana* Milde. **7***. This is common on smooth barked trees in Savernake Forest, growing with the type, and intermediate forms are also frequent.

N. complanata Hübn. **7**, **8**. Very common in Savernake Forest; c.fr., in two localities.

Pterogonium gracile Swartz. **7**. In various parts of Savernake forest, but rare; I found five capsules on an oak near Eight Walks; also poorly-developed plants on sarsen stones near Aldbourne.

Leskea polycarpa Ehrh. **7***. On a willow, near Froxfield.

Anomodon viticulosus Hook & Tayl. **7***. Near Lockeridge, Marlborough (*H. N. Dixon*).

Leptodon Smithii Mohr. **7***. On a beech near the Grand Avenue, Savernake Forest.

Thuidium tamariscinum B. & S. **7**, **8**. Mr. F. Comyns, of Newbury (Berks), tells me this species has been found fruiting near Savernake Lodge, Savernake Forest.

T. Philiberti Limpr. **7**, **8***. Among grass in Savernake Forest; by the roadside near Botley Down, about three miles south of Great Bedwyn; also near Chilton Foliat.

Brachythecium glareosum B. & S. **8**. Bank near Bedwyn, Brailes Wood.

B. albicans B. & S. **7, 8**. C.fr., on two thatched roofs in Great Bedwyn; very luxuriant and fruiting copiously on thatch at Wolfhall, Savernake.

B. rivulare B. & S. **7*, 8***. Fruiting with setæ 1¾ in. long in a bog near Burridge Heath, Great Bedwyn.

B. populeum B. & S. **7*, 8**. In considerable quantity at the roots of beeches in the Grand Avenue, Savernake Forest; by the roadside near Oakhill Wood, Fosbury.

B. illecebrum De Not. **7**. On the ground in various parts of Savernake Forest, fruiting on a gravel walk near the London and Bath Road.

B. purum Dixon. **7, 8**, C.fr., in two localities in Savernake Forest.

Eurhynchium crassinervium B. & S. **7***. Near Lockeridge, Marlborough (*Dixon*).

E. speciosum Schp. **8***. C.fr., on brickwork above water at Wilton Water, near Great Bedwyn.

E. Swartzii Hobk. **7, 8**. C.fr., under beeches in the Grand Avenue, Savernake Forest.

E. abbreviatum Schp. **7**. Hedgebank near Marlborough (*Jackson*); hedgebank near Knowle Farm.

E. pumilum Schp, **7**. C.fr., under beeches in the Grand Avenue, Savernake Forest.

E. curvisetum Husn. **7**. Savernake Forest (*Jackson*).

E. myosuroides Schp. **7, 8**. Fruiting freely in Savernake Forest.

E. rusciforme Milde. **7*, 8**. Near Lockeridge, Marlborough (*H. N. Dixon*); a common species.

E. murale Milde. **7*, 8**. Sarsen stone, near Shalbourne; two localities near Wolfhall; near Marlborough.

Plagiothecium elegans Sull. **7**. Rather plentiful in Savernake Forest near Braydon Hook.

P. denticulatum B. & S. **7***. Horse Copse, near Great Bedwyn.

P. silvaticum B. & S. **7, 8***. Wood near Ramsbury; Oakhill Wood, near Fosbury.

P. undulatum B. & S. **7***. Fine and conspicuous near the Column, Savernake Forest, and elsewhere in the Forest.

Amblystegium varium Lindb. **7*, 8***. Roadside near Great Bedwyn, "an unusual rather regularly pinnate form" *Dixon*; also near the south side of the Kennet and Avon Canal.

A. filicinum De Not. **7, 8**. Very common; c.fr., by the Kennet and Avon Canal.

Hypnum riparium L. **8**. By the Kennet and Avon Canal, near Oakhill Bridge, Little Bedwyn.

H. riparium var. *subsecundum* B. & S. **7*, 8***. C.fr., a form of this variety grew on brickwork above water at Wilton Water, near Great Bedwyn, and also on both sides of the Kennet and Avon Canal. Mr. Dixon wrote about it as follows: "Your

Hypnum is a form of *H. riparium*, and agrees quite sufficiently closely with var. *subsecundum* B. & S. Apart from the falcate leaves, it is peculiar in the erect and almost symmetrical capsule; the figure in the Bry. Eur. shows a capsule very slightly curved, but more so than in yours; so that it would seem that the conditions (? of illumination) that produced the unusual leaf direction also affected the form of the capsule."

H. stellatum Schreb. **8***. Wet place near Folly Farm, Great Bedwyn.

H. stellatum var. *protensum* Röhl. **8**. Wet place near Folly Farm, Great Bedwyn, c.fr., growing plentifully.

H. aduncum Hedw. non L. **7***. Meadow on the north side of the Kennet and Avon Canal, Great Bedwyn.

H. aduncum var. *attenuatum* Boul. **8***. Wet place near Shalbourne (*teste Dixon*).

H. palustre Huds. **7***, **8**. North and south sides of the Kennet and Avon Canal.

H. cordifolium Hedw. **8***. Among rushes in Bedwyn Brailes Wood, Great Bedwyn.

H. cuspidatum L. **7, 8**. In various localities near Great Bedwyn; c.fr.

H. Schreberi Willd. **7, 8**. By a gravel path in the north-eastern part of Savernake Forest, c.fr.; growing on thatch with *Brachythecium albicans* B. & S. in Great Bedwyn village.

Hylocomium splendens B. & S. **7, 8**. In two places by a gravel walk in the north-eastern part of Savernake Forest, c.fr.

H. loreum B. & S. **7, 8**. Savernake Forest, in several places; in a wood south-east of Little Bedwyn; wood near Froxfield.

H. squarrosum B. & S. **7, 8**. In two localities in Savernake Forest, c.fr.; in one of these localities it fruits freely for some distance; a prostrate form grows on London Clay near water at Dod's Down Brickworks, Great Bedwyn.

NEW BRITISH PLANT GALLS.

By E. W. Swanton.

Through the kindness of many cecidologists—Mr. Richard Bagnall in particular—who have supplied material, I am able to make some interesting additions to the classified catalogue of *British Plant Galls* (Methuen & Co.) published in 1912. They may be conveniently grouped under three headings. The numbers quoted refer to those in the catalogue.

I.—*Galls new to Britain. Causers known.*

On Salix repens. Twig slightly swollen, containing elongated larval cavities that are parallel to the axis of the branch. Caused by *Rhabdophaga Pierrei*. From Birtley, Durham, Mr. R. Bagnall, 1915. (To follow No. 158.)

Populus tremula. Buds greatly hypertrophied, forming green or reddish globular cauliflower-like masses, sometimes attaining one inch in diameter. Caused by *Eriophyes populi.* A very distinctive gall sent by Mr. W. Watt from Forres, September, 1913. (To follow No. 178.)

Cerastium vulgatum. Pods slightly curved and swollen, containing orange-coloured larvæ. Caused by *Perrisia fructuum.* Marton, Yorkshire, R. Bagnall, 1915. (To follow No. 348.)

Ononis repens. Flowers transformed into a mass of very small and almost sessile leaves covered with long white hairs. Caused by *Eriophyes ononidis.* Sent by Mr. J. Rayner from Southampton, July, 1915. (To follow No. 560.)

Trifolium repens. Petioles and nerves swollen and distorted. Caused by *Uromyces flectens.* See *British Rust Fungi*, p. 92, W. B. Grove, 1913.

Lathyrus montanus. Leaflets slightly swollen and rolled in a cylindrical manner, the roll containing pinkish larvæ. Caused by *Perrisia Schlechtendali.* From Birtley, co. Durham, R. Bagnall, 1915. (To follow No. 596.)

(N.B.—An error occurs on p. 214 of *British Plant Galls.* The gall No. 595 is there associated with *Vicia sepium* instead of *Lathyrus pratensis*, through the omission of a line which should have read "Lathyrus pratensis Linn. 112. Meadow Vetchling.")

Acer campestre. A felt of minute hairs on either (or both) of the leaf surfaces. It is white at first, becoming brown or reddish, and does not occur at the nerves. Caused by *Eriophyes macrochelus* var. *erinea.* In abundance at Newton Abbot, S. Devon, July, 1915, E. W. Swanton. (To follow No. 608.)

Euonymus europæus. Leaf margin rolled and discoloured, sometimes purplish; the rolled part covered with a felt of minute hairs. Caused by *Eriophyes convolvens.* Newton Abbot, 1912, Mr. Samuel Mason. (To follow No. 602.)

Geranium lucidum. Leaves tufted, swollen and deformed, with rolled margins. The interior of the roll, and very frequently the adjacent outer surface, is covered with a felt of yellowish-green (sometimes reddish) hairs. Caused by *Eriophyes geranii.* Abundant at Newton Abbot, 1912, E. W. Swanton. (To follow No. 602.)

Erodium cicutarium. Flowers swollen, forming oval galls containing the gregarious orange-coloured larvæ. Caused by *Perrisia geranii.* Brindle Bay, Northumberland, and Cowper, Durham, R. Bagnall, 1915. (To follow the above.)

Tilia vulgaris. Abnormal pilosity in the axils of the nervures on the lower surface of the leaf. The hairs are cylindrical, white, becoming brownish. Caused by *Eriophyes tiliæ* var. *liosoma.* Between Allenhead and Allendale, Northumberland, R. Bagnall, 1915. (To follow No. 422.)

Lythrum Salicaria. Bud modified; the calyx, slightly swollen at the base, forming a hard gall containing a single orange-coloured larva. Caused by *Perrisia salicariæ*, Kieff. From Bamburgh, R. Bagnall, 1915. (Family Lythraceæ, to precede Onagraceæ; No. 641.)

Œnanthe crocata. Flower-head deformed; pedicels shortened and somewhat thickened; rarely all are affected. Caused by *Philænus spumarius*. Surrey, Dorset and Devon, E. W. Swanton, 1912.

Lycopsis arvensis. Leaves, calyx and fruit swollen, bearing œcidia on yellowish spots. Caused by *Puccinia secalina*. *Brit. Rust Fungi*, p. 261, W. B. Grove. Haslemere, August, 1915, E. W. Swanton. *Echium vulgare* in the same field was not affected. (To precede No. 689.)

Echium vulgare. Swelling on mid-rib of the radical leaves. Caused by the larva of *Cynæda dentalis*. Guestling, near Hastings, Rev. E. N. Bloomfield, 1912. This gall has been observed on *Anchusa* on the Continent. (To follow No. 689.)

Linaria vulgaris. Stem producing a tuft of short branches above the point of attack. Caused by *Philænus spumarius*. Haslemere, 1912, E. W. Swanton. (To follow No. 724.)

Rubia peregrina. Apical whorl of leaves undeveloped, forming a greenish globular gall (8 × 4 mm.), which becomes black in drying. Caused by *Eriophyes rubiæ*. Slapton Sands and Petit Tor, S. Devon, 1912, E. W. Swanton. (To precede No. 774.)

Tanacetum vulgare. Leaf margins tightly rolled upwards. Caused by *Eriophyes tuberculatus*. Penshaw, R. Bagnell, August, 1915. (To follow No. 832a.)

Artemisia vulgaris. Reddish pustules on the upper surface of the leaf, with ostioles, each surrounded by hairs, on the lower one. Caused by *Eriophyes artemisiæ*. Penshaw and Hylton, co. Durham, R. Bagnall, 1915. (To follow No. 836.)

Hieracium Pilosella. An unilocular ovoid swelling on the mid-rib or on the petiole, about the size of a millet-seed, and containing a white larva. Caused by *Aulacidea pilosellæ*. (To precede No. 863.) Numerous circular pustules (appr. 5 mm. diam.). each bordered by a red zone, and containing a reddish-brown larva. Caused by *Cystiphora pilosellæ*. (To follow No. 864.) Leaf margins tightly rolled upwards. Caused by *Eriophyes pilosellæ*. The above three galls were sent by Mr. Bagnall from Penshaw in September, 1915.

Tragopogon pratense. Flower heads swollen, ovoid, remaining closed, and containing the yellow, leaping larvæ. Caused by *Contarinia tragopogonis*. Penshaw, R. Bagnall, August, 1915. (To follow No. 880.)

I have recently received from a firm of orchid growers in this country some galls caused by *Cecidomyia Cattleyæ* (see note in

Brit. Plant Galls, pp. 74, 75). They occur very sparingly, "generally on imported orchids, and mostly from the Brazils, on the Brazilian Cattleyas." I am not aware of a previous British record of this pest.

II.—*Galls new to Britain, causers unknown.*

On Pteris aquilina. Tip of the segment of a frond slightly rolled. Haslemere, August, 1915, E. W. Swanton. Howard (*Les Zoocécidies des Plantes d'Europe*, III, p. 1262) records its occurrence in Central Europe.

Salix fragilis, S. babylonica, S. alba, and S. vitellina. Catkins greatly deformed, and forming "witches' brooms" of variable dimensions. Our present knowledge of these unsightly galls and their distribution in England has been recently summarised by Mr. Miller Christy in this Journal for April, 1915. They are well known on the Continent, appearing on many willows, and Howard (*op. cit.*) gives an excellent figure of a small one. Mites have been observed in association with them by many observers, but not in Britain, and Prof. Nalepa described them under the name of *Eriophyes triradiatus*. Dr. H. Ross (*Die Pflanzengallen (Cecidien) Mittel-und Nordeuropas*, p. 255) associates *Phyllocoptes parvus* with the "witches' brooms" on S. alba and S. purpurea; *Phyllocoptes phytoptoides* with those on S. babylonica; and *Phyllocoptes phyllocoptoides* with the galls on S. purpurea. He also alludes to *Aphis amenticola*, an insect which, according to Howard, causes "Chlorantie des chatons avec phyllomanie et cladomanie" on various willows. If the "witches' brooms" on willows result from the presence of mites, they are probably caused by a single species, for it is generally observed that each gall-causing mite gives rise to a very distinctive gall; *e.g.*, there are three species of mites infesting alder leaves in this country, but their galls are abundantly distinct. (See *Brit. Plant Galls*, pp. 98, 99.)

Ulmus glabra. Numerous circular spots on the leaf, 2 to 4 mm. diam., brown, with purplish margin, and having a central opening on the lower surface. [Eriophyid ?] Between Allendale and Allenhead, Northumberland, R. Bagnall, September, 1915.

Cratægus monogyna.—Pronounced swellings on the smaller branches, at first globular, about $\frac{1}{2}$ in. diam., showing numerous larval cavities in the bark; at maturity 3 in. or more in length, completely encircling the branch, which is markedly curved, its bark brown and easily detachable. Sent by Mr. J. Rayner from Southampton, August, 1915. Similar galls have been observed on hawthorn in Germany, and are supposed to be caused by a Cecidomyid.

Epilobium angustifolium. Leaf margin abruptly folded downwards and puckered at irregular intervals. The galling occurs chiefly near the apex, and the fold is tenanted by mites. Frequent about Haslemere, August, 1915, E. W. Swanton. Observed in Germany, but the mite has not been identified.

Linaria vulgaris. Leaves rolled or folded at the margins, often bent and puckered. Beddick, Mr. R. Bagnall, September, 1915. Similar galls have been found in France and Germany, and are supposed to be caused by mites.

Veronica Chamædrys. Stems, petioles, and leaves bearing tumours of variable size. Dr. Ernest J. Schwartz reports these galls from Swanage. They have been observed in Germany, and there attributed to eelworms.

Solidago Virgaurea. Florets very feebly swollen, each containing a white dipterous larva. Gibside, co. Durham, R. Bagnall, 1915. Also recorded from France by Kieffer.

Centaurea nigra. Stem slightly swollen, containing an elongated larval cavity in the pith, with a small circular opening through the bark. [Hymenopteron?] Penshaw, R. Bagnall, September, 1915. The larvæ of *Phanacis centaureæ* frequent the stems of knapweed (in France and Germany), but live in the wood beneath the bark, not in the pith.

Leontodon hispidum. Numerous circular pustules on the leaf, margined by a purple zone. [*Cystiphora leontodontis*?] Penshaw, R. Bagnall, September, 1915.

III.—*Galls already recorded for Britain, but recently noted on plants other than those enumerated in the Catalogue.*

On Carex paniculata. Globular swellings on the stem. Caused by *Pseudohormomyia granifex*. (See No. 71.) Near Haslemere, Rev. W. A. Shaw, 1914.

Carex pendula. Utricle swollen. Caused by *Perrisia muricatæ*. (See No. 69.) Near Bewdley, Worcs., Norman G. Hadden, July, 1913.

Lychnis dioica. Flower buds swollen. Caused by *Contarinia Steini*. (See No. 345.) Penshaw, R. Bagnall, August, 1915.

Brassica arvensis. Flowers, etc., distorted and swollen. Caused by *Cystopus candidus*. (See No. 394.) Bourton, Dorset, William Herridge, July, 1913.

Pyrus torminalis. Pustules on leaf. Caused by *Eriophyes pyri*. (See No. 519.) Worcester, Miss C. E. Wetherall, July, 1913.

Cratægus Oxyacantha. Thickened yellow spots on the leaves, etc. Caused by *Gymnosporangium clavariæformis*. (See No. 546.) W. B. Grove, *British Rust Fungi*, p. 306, 1913.

Vicia Cracca. Terminal leaflets thickened and pouch-like. When many adjacent ones are attacked they resemble a cluster of small pods. Caused by *Perrisia viciæ*. Penshaw, R. Bagnall, September, 1915.

Hippophae rhamnoides. Masses of tubercles on the roots, sometimes attaining 5 cm. in diameter. Dark grey at first, darker near the base, which in old specimens is dark brown or almost black. Similar galls occur on the roots of *Alnus rotundifolia*, and in the catalogue (No. 210) are associated with *Frankiella alni*; but according to Miss Ethel R. Spratt* the overgrowths are produced by root infection of the nitrogen-fixing organism *Pseudomonas radicicola*, "a polymorphic organism, the bacillus and coccus being different forms of one and the same organism." North Wales, Miss E. R. Spratt, 1912. (Family Elæagnaceæ, to follow No. 640.)

Galium verum. Leaf margins rolled and bent. Caused by *Eriophyes galii*. (See No. 766.) Penshaw, R. Bagnall, 1915. Terminal leaves swollen and bunched. Caused by *Perrisia galiicola*. (See No. 753.) Penshaw, R. Bagnall, September, 1915.

Galium Mollugo. Leaf margins rolled and bent. Caused by *Eriophyes galii*. Newton Abbot, E. W. Swanton, July, 1915; and Penshaw, R. Bagnall, August, 1915.

Galium saxatile. Leaf margins rolled and bent. Caused by *Eriophyes galii*. Penshaw, R. Bagnall, August, 1915; and Haslemere, E. W. Swanton.

Hieracium umbellatum. Pronounced globular swelling on the stem, usually near the apex. Caused by *Aulacidea hieracii*. (See No. 866.) Haslemere, E. W. Swanton, September, 1915.

FREDERICK HAMILTON DAVEY.

By the death of Frederick Hamilton Davey, which took place, after a long and painful illness, at his residence at Perranwell, Cornwall, on September 23rd of last year, at the early age of forty-seven, British botany has been deprived of one who was not only an enthusiastic and careful worker, but the author of one of the best of our more recent local floras. Always fond of wild flowers, it was not until 1889 that, at the suggestion of the late Mr. A. O. Hume, who subsequently materially assisted in the production of the work, Davey devoted himself to the study of Cornish plants with a view to the publication of a flora. His first contribution on the subject appeared in this Journal (1900, p. 354), in whose pages numerous notes from his pen have been published. The most important of these was the description of a new *Euphrasia*, named in compliment to Dr. C. C. Vigurs, his friend and collaborator, which appears, with a plate, in this Journal for 1907 (p. 217). Another of his interesting Cornish discoveries was a variety of *Polygala serpyllacea* which was named by Dr. Chodat *vincoides* (Journ. Bot. 34, 1906).

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* "The Morphology of the Root Tubercles of Alnus and Elæagnus, and the Polymorphism of the Organism causing their Formation," Annals of Botany, vol. xxvi, no. ci, January, 1912.

The *Flora of Cornwall* (1909) was preceded by a *Tentative List* of Cornish plants (1902), which, although not published for sale,

was widely distributed among those interested in the undertaking: it is unnecessary to point out the great advantages of such a preliminary essay. This, the compiler tells us in his preface to the *Flora*, succeeded in its object: "it stimulated to further and more systematic efforts those who had already been great helpers, and it brought to our aid a number of good botanists who, until then, were ignorant of the character and extent of our work." Of the *Flora* itself the review published in this Journal (1909, 388) gives an appreciative, if somewhat critical, notice; it may be doubted whether any flora owes more to steady personal investigation, hindered though this was by ill-health and business avocations.

In addition to his contributions to this Journal, Davey published papers in the *Transactions of the Royal Cornwall Polytechnic Society* and furnished annual botanical reports to the Royal Cornwall Institution, which, in acknowledgment, presented him in 1905 with the Henwood gold medal—the first time on which this has been conferred upon a botanist. He was examiner in agricultural botany to the Cornwall County Council, and wrote the article on botany for the *Victoria History of Cornwall*; he supplied notes to the Reports of the Watson Exchange Club, of which he was a contributing member from 1901 to 1914. The last Report contains a sketch of Davey by Dr. Vigurs, to which we are indebted for information, with an excellent portrait, taken in 1902, which, by the courtesy of Mr. George Goode, Hon. Secretary and Editor to the Club, we are enabled to reproduce.

Davey is commemorated by Dr. Henry in a variety—*Daveyi*—of *Ulmus major*, which occurs in Cornwall mixed with the type "which it resembles in its wide-spreading habit, but has very pendulous branches" (*Trees of Great Britain*, p. 1884). He became a Fellow of the Linnean Society in 1903.

REVIEWS.

Catalogue of the Mesozoic Plants in the British Museum (Natural History). The Cretaceous Flora. Part II. Lower Greensand (Aptian) Plants of Britain. By MARIE C. STOPES, D.Sc.(Lond.), Ph.D.(Munich). (British Museum Publications, London, 1915.) 8vo, cloth, pp. xv, 360, 32 plates. Price £1 1*s*.

THE second part of *The Cretaceous Flora* by Dr. Stopes is concerned with the Lower Greensand flora, and in an appendix some specimens are described which are probably derived from beds of Wealden age. The value of the work from a botanical point of view is enhanced by the fact that most of the fossils are preserved as petrifactions. Twenty-seven out of a total of forty-five plants are Conifers, and it is to these that the greater part of the volume is devoted. Having regard to the absence of any flowering plants from British Wealden strata, the occurrence of petrified angiosperm wood in the Aptian beds has a special interest. The absence of any member of the *Araucarineæ* is noted as evidence in support of the conclusion that the climate was cool or even cold. It may, however, be suggested that too little weight is given to the composition of the Aptian flora; the abundance of petrified coniferous wood and the presence of only two ferns are no doubt largely the result of the physical conditions of deposition It is undoubtedly true that the Wealden vegetation points to a climate warmer than that suggested by the plants from the Lower Greensand beds ; but it does not follow that this difference is more than the expression of a contrast in the situations in which the plants grew.

A useful summary of previous work precedes the descriptive part of the catalogue. The name *Bennettites* is retained for Cycadean stems agreeing anatomically and in the possession of short fertile shoots with the type-species of Carruthers and with the American stems described by Wieland and other authors. While sympathising with a desire to preserve this name, I am inclined to think that the American plan of merging *Bennettites* into *Cycadeoidea* should be followed. Some new facts are included in the account of *Bennettites Gibsonianus*, and a new species, *B. Allchini*, is founded on a specimen in the Maidstone Museum. The generic name *Cycadeorachis*, proposed for rachises of Cycadean plants, is unnecessary in view of Saporta's genus *Cycadorachis*. It is consoling to find that so careful a student of literature as Dr. Stopes may occasionally overlook previously published names.

The study of the anatomy of fossil coniferous wood has taxed the patience and ingenuity of many workers, and their conclusions are briefly summarised by Dr. Stopes, who justly criticises certain American authors for multiplying generic names on very slender grounds. Whether or not one agrees with the identifications, there is no doubt as to the value to students of the descriptions and the discussions of affinity. The wood referred to *Taxoxylon*, because of the spiral markings on the tracheids and in part because of certain features of the medullary-ray pits, does not afford any satisfactory evidence of close affinity to the Taxeæ ; the supposed spiral bands are, I am convinced, the result of partial decay.

Some interesting additions are made to our knowledge of Abietineous cones. The generic name *Pinostrobus*, instituted by Feistmantel and overlooked by some earlier writers, is substituted for Nathorst's more recent name *Pityostrobus*, though the latter has in its favour the less definite implication of relationship to the genus *Pinus*. The cone originally described by Carruthers as *Pinites Mantellii* is designated *Cedrostrobus*, but it is open to question whether there are adequate grounds for assuming closer affinity to *Cedrus* than to *Abies*. The account of some angiospermous stems, the earliest Dicotyledons of which the structure is preserved, is a valuable contribution to the meagre information we possess with regard to the pioneers of the present dominant class. The most remarkable specimen described is that to which the name *Colymbetes Edwardsi* is given. It is a piece of stem in which cylinders of vertical tracheids alternate with cylinders of horizontal tracheids, an arrangement pointing to a waywardness in the behaviour of the cambium unknown among recent plants. The structure of the xylem-elements favours the reference of the fossil to the Cycadophyta. The name *Vectia* is proposed for a thick mass of petrified phloem which is compared with the phloem of recent conifers, but the unusual thickness of the tissue and its composition are, I venture to think, features more suggestive of a Cycadean alliance.

In her definition of the genus *Cycadeoidea* of Buckland Dr. Stopes states that the wood shows two or more, and sometimes as many as eight, concentric cylinders of secondary tracheids in contrast to the single cylinder in stems of *Bennettites* (*Cycadeoidea* of Ward and Wieland). Carruthers recognised, several years ago, two cylinders in *Cycadeoidea Yatesii*, a fact apparently overlooked by Dr. Stopes. An interesting additional case of multiple cylinders is recorded in a new stem, *Cycadeoidea Buzzardensis*. It is claimed that this power of forming more than one vascular cylinder constitutes a feature distinguishing *Cycadeoidea*, as used by Dr. Stopes, from *Bennettites*, the latter type being also characterised by the short fertile shoots intercalated among the persistent leaf-bases. It is pointed out that Buckland's specimens of *Cycadeoidea* from Portland are described by him as having more than one woody zone, and his figure shows no signs of any cones among the leaf-bases. Had Dr. Stopes consulted Buckland's later account in the Bridgwater Treatise she would have seen that the Portland stem is represented with several lateral "cones," a fact which seriously affects her argument. My own view is that the stems which she calls *Cycadeoidea* are practically indistinguishable from *Bucklandia*, and it is certain that some at least of the stems of this type bore *Williamsonia* flowers.

The illustrations deserve a special word of praise. The volume as a whole reaches a high standard, and the author is to be congratulated on her handling of an extremely difficult piece of research.

A. C. SEWARD.

Beiträge zur Kryptogamenflora der Schweiz. Band V, Heft 1. Die Schweizerischen Protomycetaceen mit besonderer Berücksichtigung ihrer Entwicklungsgeschichte und Biologie. By G. VON BÜREN. Bern: K. J. Wyss. 1915. 95 pp., 28 text-figures, 7 plates. 10 fr.

THIS monograph is the first, as far as the reviewer is aware, dealing with the Protomycetaceæ, a group which is little understood by most mycologists. It is certainly a matter of surprise to find ninety-five pages devoted to them in a flora, but investigation reveals the fact that only fifteen pages relate to the systematic portion, the rest of the monograph concerning itself with the morphology and biology of the group, a subject on which the author has already published several short preliminary papers.

According to Büren the family contains four genera, *Protomyces*, *Protomycopsis*, *Volkartia* * (*V. umbelliferarum* and *V. rhætica*) and *Taphridium* * (*T. algeriense* and *T. inundatum*, neither of which species has yet been found in Switzerland). The general account treats these genera separately. Over fifty pages are taken up with *Protomyces*: the account opens with a historical study of the genus, then the several species receive separate treatment first from a study of living specimens, and then from a cytological standpoint. It must be said that the general portion suffers from prolixity—a common failing in botanical works written in German. The author gives an account of his experiments on the specialization of parasitism in *Protomyces macrosporus*, and distinguishes the formæ speciales *Cicutariæ*, *Carvi*, *Ægopodii*, *Heraclei* and *Laserpitii latifolii*. In the case of the species infecting Compositæ three species are given, *P. pachydermus*, *P. kreuthensis* and *P. Crepidis* "nov. spec. ad interim." There is no morphological difference between the first two species, but they are restricted to their special hosts; in *P. Crepidis* there is a slight difference in the shape of the "ascus" and in the effect on the host. *Protomycopsis* is treated historically, and its development and cytology are then given. *Taphridium* and *Volkartia* are next considered, and a differentiation made between them principally on the difference in spore formation. The result is that the species first described by Rostrup in 1885 as *Taphrina umbelliferarum* now enters into its fourth genus! The systematic position of the Protomycetacæ has been always a matter of debate. Büren considers they are best placed in the Protascineæ, forming a subfamily with *Dipodascus*. This entails the suggestion that each spore mother-cell should be considered as an ascus which is rather startling having regard to the method of spore formation. The interesting parallel between the Ustilagineæ and the Protomycetaceæ is also pointed out.

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* As to the use of the generic names *Volkartia*, *Taphridium* and *Magnusiella*, the present writer hopes to deal in a future number of this Journal.

In the systematic portion the descriptions seem clear and accurate, and there are plenty of figures to help one in the identification of species, though here, as in most obligate parasites, an identification of the host plant is one of the most certain clues to the specific identification of the fungus parasite. The seven plates deal with cytological details. A bibliography, an index of species, and an index of host plants are given. The printing is good and the monograph is one which must be consulted by all who are concerned with the group treated.

J. Ramsbottom.

The Flora of the Nilgiri and Pulney Hill-tops (*above* 6500 *ft.*), *being the wild and commoner introduced Flowering Plants round the Hill-stations of Ootacamund, Kotagiri, and Kodaikanal.* By P. F. Fyson, B.A., F.L.S., Professor of Botany, Presidency College, Madras. 8vo. cloth. Vol. i, pp. xxvi, 475, 4 maps. Vol. ii, 268 plates. Price 10 rupees.

It is no disparagement to the carefully drawn up text of this work to say that its most attractive portion is the plates which make up its second volume. The absence of figures has hitherto, with very few exceptions, been a serious drawback to the usefulness of colonial floras, whether of a country or of a district. In every place the number of folk who will take the trouble to master a scientific description, however plainly worded, is few; but there are many who, helped in the first instance by pictures, will proceed to elementary books and descriptions, and will—at any rate in some few cases—end in doing useful work. It is thus no small boon to Indian botanists to have in a readily accessible form nearly three hundred carefully executed figures of varying degrees of excellence representing typical examples of the flora, indigenous and introduced; we say to Indian botanists generally, because the species figured are for the most part widely distributed throughout the continent.

The letterpress, as we have said, is very carefully done; the descriptions of the species are full, and to each genus is added a note as to its extent and world distribution, after the manner of Hooker's *Student's Flora.* There is a key to the families, and to the species of the larger genera, and a summary of its characteristics is prefixed to each order. "The total number of species described is nearly 500, of which 430 are considered indigenous"; these are distributed among 264 genera, exclusive of introductions. There are ten species described as "entirely new," of which, however, "the usual Latin descriptions have already appeared in the *Kew Bulletin*"; of these four are Eriocaulons, three Crotalarias, while *Lasianthus*, *Anaphalis*, and *Olea* have one each. Certain revisions of nomenclature have taken place, necessitating changes in some of the names adopted in the *Flora of British India*, which is referred to throughout. We regret to see that trivials derived from personal proper names begin with a small letter—a practice at one time in vogue at Kew, but subsequently discarded in opposition to the Vienna Rules.

A word must be said in praise of the get-up of the book, which is printed at the Madras Government Press. The type and paper are good, the typographical arrangements are excellent; there is only one index, which includes both text and plates.

A School Flora, for the Use of Elementary Botanical Classes. By W. Marshall Watts, D.Sc. (Lond.), B.Sc. (Vict.), late Physical Science Master in the Giggleswick Grammar School. New edition, with 205 illustrations. Longmans, Green & Co. 1915. Pp. viii, 208. Price 3*s.* 6*d.*

This book is intended to provide elementary students with a flora of such small size as to be easily carried on country rambles, which shall enable them readily to identify the common plants with which they will meet; it seems to satisfy their needs quite well. Originally compiled for the local use of the botanical class at Giggleswick, it has been enlarged so as to make it equally useful for schools in other parts of the country.

Plants having a higher census-number than 50 in the *London Catalogue*, ed. 8 (1886), are reckoned as common, and printed in capitals; those probably not indigenous being in thin type. The rarer species growing within reach of particular schools are in small type, with the shortened place-names appended. Marlborough was, I believe, the first to start a Natural History Society (about 1864), under that excellent all-round naturalist the Rev. T. A. Preston. This movement is now clearly widespread, lists having been received from no fewer than thirty schools (all English, excepting Belfast) ; the most notable absentees are Eton, Harrow, Shrewsbury, and Uppingham.

"It has been sought to render the task of determining an unknown plant as easy as possible by making each step of the process to consist in deciding which of *two opposite* characters the plant under examination possesses. . . . While the arrangement of the tables is frequently arbitrary, and applicable only to the particular set of plants included in this work, the characters of each natural order have been given at some length, and are those of the British plants of the order considered as a whole."

A synopsis of the natural orders and a key to the subclasses and natural orders precede the main subject, in which the generic and specific characters are briefly, but sufficiently, described. A good glossary, and an artificial key for the identification of trees and shrubs (many of them cultivated) from their leaves, together with an index, conclude the work.

A few of the rarities alleged to occur near special schools are very questionable ; for instance, *Linum perenne* certainly does not grow wild near Taunton, nor *Cotoneaster vulgaris* near Charterhouse, nor *Arbutus* near Epsom ; and *Carex divisa* ("Malham Cove") was probably mistaken for *C. disticha.* Doubtless, however, the author had to take the lists as he found them.

The nomenclature is old-fashioned. *Hieracium Lawsoni* does duty for *H. anglicum*; "*Campanula*" *hybrida* comes between *C. glomerata* and *C. Trachelium.* Natural sequence is at times ignored ; thus, *Potentilla Comarum* separates *P. Tormentilla* from *P. procumbeus*, whereas *P. verna* and *P. alpestris* have been treated as distinct species. Two or more *London Catalogue* segregates are frequently combined under one name, the writer's aim not being critical.

Though small, the illustrations seem to be adequate ; one or two floral diagrams are rather weird, and the drawing of *Conium*, apart from the detached flower and fruit, hardly helps towards identification.

The book is well got up, concisely and modestly written, and should be useful to beginners. Some slips occur; *Lyciüm* "*barbatum*," "Marden" Pink, "*Onopordium*," "*Jasminium*," *Pinus* "*exelsa*." *Viola tricolor* is not mainly a feature of pastures, nor *Genista tinctoria* of thickets, nor *Gentiana Amarella* of dry heaths, nor *G. campestris* of chalk and limestone hills ; but an observer's personal experience should be allowed for.

EDWARD S. MARSHALL.

SHORT NOTES.

British Rubi.—The Editor kindly allows me through the Journal to ask my numerous correspondents on Rubi to send their parcels of specimens for identification and criticism to the Rev. H. J. Riddelsdell, Wiggington Rectory, Banbury. After a preliminary examination and determination by him Mr. Riddelsdell will forward them all to me, and so give my correspondents the advantage of two determinations instead of one, while appreciably lightening my work as final referee. I will undertake to return the parcels to their owners as quickly as possible. —W. Moyle Rogers.

Potamogeton Drucei.—When writing my review of *British Pond Weeds* (Journ. Bot. 1915, pp. 186–8), I overlooked Mr. Fryer's note in Journ. Bot. 1899, p. 524, which states his reasons for considering this to be a valid species rather than a hybrid. Not having seen the book before its completion, I had forgotten that it was brought out by instalments, and that some of the opinions expressed at an earlier stage might have been changed. It seems best to call attention to this important fact.—Edward S. Marshall.

Dialysis of the Corolla in Convolvulus arvensis L. (Journ. Bot., 1915, p. 359).—Since the appearance of my paper, Mr. Druce has kindly called my attention to a mention of a plant, identical with those described by me, in his *Flora of Berkshire* (1897), p. 357; to his having published a varietal name for it in the *Botanical Exchange Club Report* for 1913 (p. 330); and to his having there recorded a similar plant found in that year. The original plant is in the herbarium of Charles DuBois (1656–1740) at Oxford, having been found "near Henley" (which may mean Oxfordshire or Berkshire) by the Rev. William Stonestreet (1716), who describes it as "cum flore albo parva in 5 vel 6 lacinias profunde dissecto." Though Stonestreet, who was Rector of St. Stephen's, Walbrook, was a correspondent of Petiver, Plukenet, and Buddle, he does not appear to have communicated this plant to them—at least, it does not seem to have been published before the issue of Mr. Druce's Flora. In the Exchange Club Report Mr. Druce gives it the varietal name *Stonestreetii*, thus antedating the name *schizopetala* proposed by me. The new record that Mr. Druce adds is: "Aldeburgh, Suffolk, July, 1913, but not so deeply cut." I now find that there is a specimen of Rand's plant in the Sloane Herbarium (cxxii, f. 21), communicated by him to Buddle. Following an example of the small-flowered form, it is described as: "Convolvulus minimus flore etiam minimo nunc integro ad centrum usque quinquepartito.—D. Rand." Buddle died in 1715, the year before the death of Stonestreet, so that we can only consider the finding of this form by the latter near Henley and by the former, presumably, as recorded by Dillenius, near Maidstone, as practically contemporaneous. The Sloane Herbarium specimen has the small markedly hastate leaves of the Basingstoke plant, so that the foliage, the dialysed corolla, and the absence of pink coloration combine to suggest that the form is a depauperate one.—G. S. Boulger.

Greek Plants.—At Itea, on the Gulf of Corinth, I gathered in May, 1914, *Bupleurum semicompositum* L., which Mr. C. C. Lacaita kindly identified. It is not given for Greece either in Nymans's *Conspectus* or by Halácsy. At Patras, and on the mainland near Phaleron I saw *Polygonum heterophyllum* Lindman, and at Canone Corfu *Crepis setosa* Hall f., which is new to that island. The true *Veronica Anagallis* L. I noticed near the monastery on Pentelicon.—G. Claridge Druce.

BOOK-NOTES, NEWS, &c.

On and after New Year's Day the following fees will be charged, "in the interests of national economy," for admission to the Royal Botanic Gardens: On Mondays, Wednesdays, Thursdays, Saturdays, Sundays, and Good Friday, 1*d*. On Tuesdays and Fridays, except Good Friday (Students' Days), 6*d*. A charge of 3*d*. is made for the admission of photographic apparatus. Bath-chairs will be permitted to enter the Gardens during public hours when the condition of the paths is suitable on payment of 1*s*. on Students' Days (Tuesdays and Fridays, except Good Friday), and on payment of 6*d*. on other days. Students' permits, available till the close of the calendar year and obtainable on written application to the Director by bona fide students and artists, will be issued on payment of a fee of 5*s*. These permits will cover free entrance on Students' Days and before public hours on week days except Good Friday and Bank Holidays. Season tickets, available till the close of the calendar year, can be obtained on written application to the Director on payment of a fee of £1. These tickets will cover admission on any day during public hours.

Kew, which is thus prominently before the general public—who will hardly like being deprived of a privilege which they have possessed, we think, since 1841—has lately come under the notice of the literary world in the *Memories* of Lord Redesdale, who devotes a chapter to his reminiscences of Sir Joseph Hooker. He is somewhat aggrieved at Sir William Thiselton-Dyer's reference to the Office of Works (of which, as Mr. Freeman-Mitford, Lord Redesdale was Secretary) as having regarded Kew Gardens as "only a pleasure-ground," and as "never having felt much sympathy for its scientific character and functions." The reflection is the more strongly resented in that it was during Mr. Mitford's secretariat, and to some extent through his influence, that the Assistant Directorship (of which post Mr. Dyer, as he then was, was the first occupant) was created. Lord Redesdale, however, finds legitimate consolation in the warm praise which Sir Joseph bestowed on him in the dedication to vol. cxxiii of the *Botanical Magazine*. But we do not think that Lord Redesdale is himself quite fair to his predecessor, Mr. Ayrton, in charging him with attempting to reduce Kew "to the level of the nursery-maid and her perambulator." Those who are old enough to remember the controversy which raged with violence during 1872 will, we think, feel that, although Ayrton's attitude and action could hardly be defended, he was somewhat unfairly treated by his powerful and successful opponents.

At the meeting of the Linnean Society on November 18th, 1915, Dr. E. J. Salisbury, F.L.S., showed a series of lantern-slides, entitled "Photographic Studies of Welsh Vegetation." The following is an abstract of his remarks: 1. The Vegetation of the Limestone: (*a*) The limestone cliffs; vegetation of *Festuca ovina* and hairy species, such as *Arabis hirsuta*, *Geranium sanguineum*, *Parietaria officinalis*; fleshy species as *Brassica oleracea* and *Spergularia rupestris*; or leathery-leaved species, as *Thalictrum minus*, *Cotoneaster vulgaris*, and *Hedera Helix*. (*b*) Limestone pasture, with the dominant species *Festuca ovina*, accompanied by many of the common chalk-down species. Characteristic plants are *Helianthemum canum* f., *Spiræa Filipendula*, *Veronica spicata* var. *hybrida*, and *Spiranthes autumnalis*. Locally small woods of *Quercus sessiliflora* occur, though usually confined to siliceous soils. Exposure effect. 2. The vegetation of the Siliceous Soils: (*a*) The *Quercus sessiliflora* woods, with associated trees as *Betula* spp. and *Pyrus aucuparia*. Where the water-content is high, but the soil not acid, *Fraxinus* becomes common. As a result of felling or exposure *Betula pubescens* may become the dominant tree. The average light-intensity in summer is about 7·6 per cent. of the maximum diffuse illumination outside. The shrub layer is usually poor. The flora of the drier parts largely consists of heath species; in the wetter and more acid parts, *Vaccinum Myrtillus* is often abundant; towards the base of the slopes the ground flora is often almost entirely cryptogamic. Epiphytes, as *Polypodium vulgare*, *Frullania* spp., and lichens are often abundant. In the valley bottom the *Quercus sessiliflora* woods merge into *Alnus* woods, with a light intensity of about 3 per cent. or under. (*b*) Scrub chiefly of *Cratægus*. 3. The subalpine Vegetation; (*a*) The subalpine lakes with *Subularia aquatica*, *Lobelia Dortmanna*, *Littorella lacustris*, and *Isoëtes*, with absence of marginal vegetation. (*b*) The subalpine pastures (*Nardus*, *Lycopodium* spp., etc.).

Messrs. Wells Gardner send us a pretty book—*Plants We Play With* (3*s*. 6*d*. net), by H. R. Robertson—which, though not precisely botanical, deals with British plants and the simple amusements which children associate with them. There is "conquers," played with horse-chestnuts, and "champions"—in the North they call it "kemps"—with ribwort-plantain; walnuts supply walnut-shell boats and willow-branches whistles; you tell the time by the dandelion-clock, and the future by rye-grass and moon-daisy; there are daisy-chains and whips made of rushes, and so on. There are forty pictures, twenty very nicely coloured and twenty plain, portraying the plants and the children amusing themselves with them; the former are dainty and delicate, but at times a little weak—criticisms which also apply to the accompanying rhymes. The flowers are mostly well drawn, sufficiently so at any rate to enable one to determine that the buttercup labelled *Ranunculus bulbosus* is not that species.

A NEW part (vol. iii, part 1) of Mr. J. F. Duthie's *Flora of the Upper Gangetic Plain*, has lately been issued by the Government Press, Calcutta; it includes the orders *Nyctaginaceæ* to *Ceratophyllaceæ*. It is evidently very carefully done; the descriptions are full, and a clavis is given for the species of the larger genera. Of convenient size for the pocket, the book should be invaluable to the collector; it is also remarkably cheap—1*s*. 10*d*. for 168 well-printed pages. The book can be obtained of Messrs. Constable and the usual London agents.

THE recent part (viii, part 8, December, 1915) of the *Transactions of the Linnean Society* contains notes on the morphology of certain structures concerned in reproduction in the genus *Gnetum* (with two plates) by Mr. H. H. W. Pearson, and a paper on *Isoetes japonica* (with seven plates) by Mr. Cyril West and Dr. H. Takeda.

THE danger of trusting to a title has been experienced by a writer in the *Westminster Gazette* of December 16th, who refers to Curtis's *Flora Londinensis* as "still the best guide to the wild flowers found near London"!

WE have received the *Report for 1914 of the Botanical Exchange Club*, by the Editor and Distributor, Mr. R. H. Corstorphine (issued in November last), and the *Report of the Watson Botanical Exchange Club*, 1914–15, edited by the Hon. Secretary, Mr. George Goode, both of which we hope to notice in an early number.

OUR readers will observe that, owing to the incorporation of Messrs. West, Newman & Co., with Messrs. Adlard & Son, the payment of subscriptions should be made to the latter firm, whose temporary address is 76, Newgate Street, E.C. The difficulties attending the transfer of stock, etc., may account for the lateness of the present number—a delay for which the Editor, who for so many years has generally succeeded in achieving publication on the first of the month, cannot accept responsibility. We trust that it may be possible later to resume the regularity which has distinguished the Journal for more than thirty years, but this must depend on matters beyond editorial control.

THE BOTANY OF ANTIGUA.

By L. Richmond Wheeler, B.Sc.(Lond.).

These notes have been drawn up at the close of two years residence in Antigua, during which I have investigated the plants of the different regions into which the island is divided; while I have visited practically every island of importance in the Lesser Antilles except Barbados, and so have been able to compare the flora of Antigua with those of the other islands with which Antigua is connected by position and geological considerations. The islands thus visited include St. Thomas, St. Croix, St. Kitts, Barbuda, Dominica, St. Lucia, St. Vincent, Grenada, and Trinidad; the last named is, of course, to be considered as part of South America from the scientific standpoint rather than as belonging to the volcanic or calcareous series which form the chain of islands known as the Lesser Antilles. I have also had opportunities of discussion with local botanists, planters, and agricultural officers.

There is a most regrettable absence of books dealing with the natural history of the islands; and many valuable papers (most of which are by Americans) on their geology, etc., are difficult of access to a student on the spot. Grisebach's *Flora of the British West Indies* is still invaluable, and is the only flora dealing with the plants of these islands in a complete way; but it is very old-fashioned and, in many ways, obsolete, the first and only edition having been published about 1863; it also labours under the disadvantage of having been written by a botanist who never visited the West Indies, but had to depend entirely on collections of dried specimens. Fortunately one of these, made by the Rev. Mr. Wullschlagel, of the Moravian Missionary Society, included a large number of Antiguan plants. The admirable and exhaustive researches of the various Agricultural Departments in the West Indies, under the supervision of the Imperial Commissioner of Agriculture, are entirely concerned with economic crops and agricultural investigations.

Another difficulty facing the student is the general lack of knowledge of, and interest in, wild plants among the populations of these interesting islands. So these notes must be regarded as incomplete and in need of amplifications and additions for which I should be grateful to any persons with a knowledge of the subject. I have pleasure in acknowledging assistance from Dr. A. B. Rendle, of the British Museum, and from Dr. Tempany and Mr. Jackson, of the Agricultural Department of the Leeward Islands.

I. Conditions Governing the Distribution and Character of the Plants of Antigua.

a. *Geographical.*—Antigua lies in latitude 17 N. and longitude 61 W., being one of the more northerly islands in the Lesser Antilles. It belongs to the British Crown Colony of the Leeward

Islands, and is the seat of Government. Its nearest neighbour is Barbuda, about twenty-seven miles to the north, while Montserrat is about thirty miles to the south. Its area is 108 square miles, being somewhat smaller than the Isle of Wight; the coast line is long, as there are many bays and harbours all round the island. The sea around Antigua is very shallow, and is beset with coral reefs, so that the harbours are of little value for shipping. If the land were elevated 100 fathoms the island would increase many times over in area, and Barbuda would then form part of it.

It lies well within the limits of the North-east Trade Wind zone, which blows steadily upon the island for nearly every day in the year with considerable strength. When this fails, either a heavy and oppressive calmness prevails, or else very slight breezes blow from the east or south, but these are so slight and so infrequent that they may be neglected from the point of view of seed dispersal. A glance at a map of the world will show the impossibility of seeds being carried to Antigua by the Trade Wind, as there is no land in the Trade Wind belt nearer than the Cape Verde Islands, 2000 miles away; and the gale does not even blow directly from these islands to the West Indies.

The island lies in the path of the North Equatorial Current, but this current is not felt very strongly. As this current flows in the same general direction as the North Trade Wind, with which, of course, it is intimately connected, and as, like the Trade Wind, it arises in the landless bosom of the North Atlantic, it is clear that it cannot affect the flora of the island by introducing plants whose seeds are water borne like the Coconut and Manchineel.

The only wind which could possibly be the means of introducing new species of plants is the destructive Hurricane, which blows sometimes with the greatest violence and fury over Antigua and the neighbouring islands, bringing total destruction in its wake. Hurricanes, however, are fortunately rare, only two being recorded for the last forty years in Antigua; and the number of plants introduced by their agency must be very few, if indeed any at all.

B. *Climatic.*—The climate is tropical, but, like other small tropical islands, does not show any great degree of heat. The temperature does not show any great extremes, whether considered from the daily or annual aspect. The average annual maximum is about 85 or 86° F.; the average annual minimum is about 72° F. On the hottest days the maximum is seldom above 90° F., while in the coolest nights the lowest readings are never below 60° F. These figures are fairly correct for the whole of the island, for, as the highest mountains are less than 1400 feet, there are no stations where cool temperatures occur, as on the mountains of Dominica (5000 feet) or Jamaica (6000–7000 feet) or most of the other West Indian islands.

The lowness of the island is the cause of the relatively small rainfall, which has averaged about 45 inches per annum for the past forty years. As a contrast to this, most stations in the fertile and mountainous island of Dominica, 200 miles to the south, get an average yearly rainfall of 130 inches, certain points having nearly 300 inches in the year.

There is no rainy season in Antigua, though, as a rule, the months from September to December are wetter than the early months of the year. Droughts are of frequent occurrence, and are sometimes very severe; while the rains, when they do come, are often very local, one estate getting 3 or 4 inches while another a few miles away gets little or none.

The early months of the year are cooler than the later months; but this is due more to the greater power of the Trade Wind than to differences of temperature.

There are no seasonal changes in plants as there are in England, or in tropical countries like India where one season is regularly wet and another regularly dry. During the dry weather the plants adopt a xerophytic habit; leaves drop off, flower buds remain unopened, and seeds lie dormant in the ground. But should a few inches of rain fall after weeks of dryness, no matter what the time of year, all the seedlings sprout vigorously, the trees are covered again in sheen, the activity of the quiescent cambium is renewed, and great bursts of glorious flowering occur on such trees as the Flamboyant (*Poinciana regia*) Tamarind (*Tamarindus indica*) and Scarlet Cordia. It follows that terminal bud-scars and "annual" rings have no significance as registers of the age of a tree, but merely indicate the number of droughts and intervening spells of wet weather.

Owing to the smallness and irregularity of the rainfall, the whole vegetation partakes of a xerophytic character. This is the more marked as there are no large springs in the island and no streams worthy of the name. Many parts of the island have a large amount of sodium chloride, so that water drawn from them shows an amount of chlorine greatly above the average; thus at two stations in the Central Plain the sodium chloride content was considerably over 1000 parts per 100,000. This also tends to produce xerophytic characters in the flora, especially in the Central Plain.

The geographical configuration of the island, with the mountains in the south-west, causes more rain to fall in that part than in the north and east. The rain drains quickly off the steep mountains and gives a fair supply to the valleys between them, such as Christian Valley and Blubber Valley.

c. *Geological.*—The geology of Antigua is very interesting, and has called forth various theories of very divers natures; and the relations of the different formations to one another cannot yet be considered as settled. All geologists, however, are agreed that Antigua consists of three distinct formations which occupy respectively the north-east, south-west, and centre of the island, their boundaries running approximately from north-west to south-east.

The northern formation is a limestone which is usually considered to belong to the Oligocene. It corresponds with the limestone of which Barbuda, the eastern half of Guadaloupe, Anguilla, and a few other islands are composed. This region is hilly but not mountainous, very little being over 400 feet, and it presents a smooth and gently undulating aspect like the chalk hills of the Chilterns or the lower ranges of the Downs. The lower layers of the formation are usually strongly impregnated with sodium chloride. Many small islands such as Long Island and Iguana Island lie off this part of the shore and are mostly low; sometimes with small cliffs of hard limestone cut about and eroded by the Atlantic surge. This formation is termed the Antigua Limestone.

The south-west portion of the island is of volcanic origin; its date is uncertain, but it is certainly not a primary igneous rock. There is abundant evidence at many parts of the coast of this region to show that the volcanic matter was forced through sedimentary rock. For instance, between English Harbour and Falmouth Harbour, the two formations can be seen side by side, the sedimentary strata having been upheaved and metamorphosed by the intrusion of the igneous rock. There are no definite craters to be found, though such inlets as English Harbour and Five Islands Bay have been sometimes considered as such.

The mountains here, though not often rising above 1,200 feet (Boggy Peak, the highest, being only 1,360 feet), are bold and rugged, showing the features of a mountain plateau worn by erosion. The mountains are only scantily clothed with vegetation; but the valleys, sheltered by their steep sides, are very fertile, and, owing to their protection from the desiccating influence of the Trade Wind, and to their comparatively good rainfall, show a strong resemblance to those of moister islands like Dominica and Trinidad. Many tropical products, such as Vanilla and Cocoa, can be grown in them which could not exist in other parts of the island. They are also enriched by soil washed down from the surrounding heights. These mountains are Andesitic in composition.

The land between these two ranges of hills is called the Central Plain. It is, however, very undulating, and is not of homogeneous composition. It consists largely of clays, but is also diversified by sandstones, gravel beds, and limestone, which last forms the small hills found mainly in its north-western part. Its origin and place in the geological history of Antigua are not decided yet, but they must be settled by geologists and not by botanists. Part of it is doubtless alluvial, but the tuff which occurs is very probably older than the Antigua Limestone. The surface is mostly covered by clay which is very heavy in the southern part near Bendals. There are small ponds scattered through it at intervals, and there is a small watercourse called Bendals stream which allows the surplus water to run off after heavy rain, when it may be quite swollen though usually it is very dry.

Both the Central Plain and the Limestone district are largely covered by sugar estates, sugar being almost the only crop which can be grown with satisfaction under the prevailing climatic conditions.

All round the coast, especially in the numerous bays and harbours, there are swampy tracts covered with Mangroves; while in other parts the shore consists largely of beaches of coral sand maintaining a well-marked group of halophytic plants.

D. *Human Agency.*—As Antigua has been inhabited and cultivated by the British for 250 years, it is evident that a number of plants must have been introduced, intentionally or otherwise. The Tamarind (*Tamarindus indica*) and *Casuarina equisetifolia* are examples of trees which are not really indigenous, but which have almost become a part of the wild Flora. The Coconut (*Cocos nucifera*), too, is almost certainly an introduced species.

Of real weeds very few seem to have been brought in; one good example is the Sow Thistle (*Sonchus oleraceus*), with its variety *S. asper*, from Great Britain, which is now commonly found around cane fields. Another and a tropical weed is the Mexican Poppy (*Argemone mexicana*), called "thistle" locally because of its spiny leaves; this is rarely found except round dwellings or crops, where it is plentiful.

No doubt the most serious change produced by human agency is seen in the reckless destruction of the native trees in time past for fuel for sugar-making. Although Antigua could not be said to have been covered with forest, nevertheless there were dense thickets and hangers of such valuable trees as the Logwood (*Hæmatoxylon campeachianum*) and Mango (*Mangifera indica*) on many hill sides, which are now bare or sparsely covered with small Acacia bushes. This is greatly to be regretted from the view point of conservation of rain; much of the small rainfall comes in heavy showers upon the parched land and rushes off the surface to the sea through the little channels which exist in all parts and so is irretrievably lost. The presence of strong masses of low trees must also have been a great check upon evaporation, which is very considerable owing to the strength of the sun, the constancy and force of the North-east Trade Wind and the exposed character of the island (except for the mountain valleys already mentioned).

II. The Flora of Antigua.

Origin.—As has been shown above, wind and sea can scarcely have brought any new plants to the island, while very few of the plants introduced by man have succeeded in establishing themselves as wild plants; though, in addition to the examples given above, we have an interesting case in the pink Lotus Lily, whose large peltate leaves and big flowers adorn nearly all the ponds in the island.

Some seeds may, however, have been introduced by birds. Duck, geese, and pigeon used formerly to visit Antigua in large numbers and do so still to a less extent. Also terns, frigate birds, pelicans, and sea-gulls are common, and breed on the small islets which abound round the coast; so, too, do the gaulins, heron-like birds, either white or grey. All these birds are powerful fliers and can pass from island to island with the utmost ease, and some of them doubtless travel between North and South America, passing through the Caribbean Islands on their way. Unfortunately, great havoc has been caused among all the birds of the Islands, especially the Trochilidae and Passeridae, by the Mongoose. This lives in a wild state, having been introduced originally to keep down the rats. It has thoroughly gained a footing and is likely to maintain it in spite of the persecution it is now subjected to on account of its ravages among birds and lizards, Nature's sentinels over the insect pests which harass the crops of the island. Seeds introduced by birds would usually be those likely to occur in the soft mud from ponds or swamps which might adhere to the feet; I think it is very doubtful indeed whether there are any plants in Antigua in these situations which can have been brought in this way. It is interesting to note, in this connection, that a Misseltoe is abundant in Barbuda and bears berries freely, and yet it is never or very rarely (I have never seen it) found in Antigua, although its host plant, the Loblolly, is fairly common; and Misseltoe depends on birds for its seed-dispersal.

So that, in the main, the Flora of Antigua is of great antiquity, and its origin can only be explained when the origin of the islands of the Lesser Antilles has been determined.

General Characters.—The climatic conditions described above make Antigua a thoroughly xerophytic station. In every part we find prickles, spines, reduced leaf-surface, fleshy leaves, thick-skinned leaves, overlapping leaves. Again and again during the year, as weeks of dryness intervene, leafless and flowerless stems meet the eye in every direction, rendered all the more conspicuous by the bursts of leafage and flowering when a few inches of rain revive these hardy plants. And woe to the unlucky botanist whose period for collecting coincides with a period of drought!

The vegetation is largely composed, both as regards species and individuals, of a few dominant orders.

The Grass Family (Gramineæ) takes a foremost place, as it does throughout the world. But the Antiguan species are very poor and stringy, and include hardly any kinds which are useful as fodder. Some of them, such as the Devil's Grass (*Cynodon Dactylon*), with its long troublesome suckers, and the Burr Grass (*Cenchrus tribuloides*) have subterranean stems which serve to withstand drought as well as to perform vegetative reproduction. Other common grasses are *Sporobolus indicus* and the Bamboo Grass (*Arundinaria*). But it is difficult in many cases to decide between aboriginal plants and those whose seeds have been brought in from Barbados or elsewhere. The grasses are wide-spread, as a rule, and not typical of the various botanical divisions of the island dealt with below.

The Leguminosæ are very abundant, all three sub-orders being represented. The Acacias, locally called Cossi, form the preponderating part of the scrub, which originally covered all the lower parts of the island. Papilionaceæ abound, being mostly twiners; none of them have leaf-tendrils. Many Cæsalpiniæ occur abundantly; the Nickers (*Cæsalpinia* spp.) and many Cassias are indigenous and very common, while Barbados Pride (*Cæsalpinia pulcherrima*) and the Flamboyant are among the most successful ornamental plants.

The Combretaceæ have a vast number of individuals among the Mangrove in the swamps and in the Antigua Whitewood (*Terminalia Buceras*) of the low lying parts of the Central Plain.

The Euphorbiaceæ are well represented, as are the Convolvulaceæ, with *Ipomœa* and *Cuscuta* as the chief genera.

Amaryllidaceæ are very common both as wild and cultivated plants; much more so than the Liliaceæ.

Solanaceæ furnish many of the commonest weeds and also some garden plants like the Egg-plant—the Tomato and English Potato are also grown.

Compositæ are only represented by a few species, which are, however, mostly very common, such as the different kinds of *Wedelia* and the wild Tobacco (*Pluchea odorata*).

Only two or three small orchids occur in the island, one being the Yellow Orchid (*Oncidium Lemonianum*). Cactaceæ and Bromeliaceæ, as might be expected, are very well represented, including the most markedly xerophytic plants in the flora.

There are very few indigenous Palms. The Date, Coconut, and Cabbage Palm (*Oreodoxa regia*) all grow well, while the graceful Gru-gru occurs in the sheltered valleys of the volcanic region. The Coconut is certainly introduced by man, and probably the Date (*Phœnix dactylifera*) also.

The Tree Ferns which are so conspicuous in St. Kitts are conspicuous in Antigua only by their absence. Indeed ferns of all kinds seem to find the dryness of Antigua too much for them. Their absence is everywhere noticeable.

A Comparison of the Flora with those of the neighbouring islands.—The flora of Antigua differs markedly from those of the other islands. The difference is mainly due to the xerophytic characteristics of the vegetation of Antigua, consequent on its small rainfall and its openness to the Trade Wind. Only in the valleys of the south-west do we find the rich green and the tropical profusion of Dominica, Grenada, St. Vincent, and the rest. Only here can limes, oranges, bananas, and other typical fruits be produced; and only here to any extent are there patches of true forest with giant Silk-cottons (*Eriodendron*) and long hanging lianes.

The Central Plain, with its principal covering of Acacias, is, both geologically and botanically, unique in the West Indies, to my knowledge. The plants of the Volcanic Region are of the same *general* type as those of the volcanic islands composing the Windward and Leeward Islands. The Limestone area differs considerably in the character of its flora from Barbuda, which is only twenty-six miles north of it, and is composed entirely of limestone, being a typical coral formed island. It has very little "Cossi"; it is covered in most places with bush consisting of

"Wattle," Loblolly (*Pisonia subcordata*), which is frequently crowned by a species of *Loranthus* bearing smallish white berries, *Pimenta acris*, and Balsam (*Lantana ?*). Prickly Pear (*Opuntia Tuna*) is not common, while the Turk's Head (*Melocactus communis*) occurs all over the bare limestone surface. Many other shrubs and herbs occur which I had no time to identify during a short visit I paid, but at least I could note that they were distinct from any Antigua plants. Mention will be made later of the very interesting and quite distinctive group of plants found on the limestone cliffs at Two Foot Bay, where the little hills (200 ft. or less) occur which alone break Barbuda's uniform level just a few feet above the sea.

In dependence on the three geological divisions of Antigua there are three Typical Plant Associations, which are well defined and distinct from one another. In addition to these there are two which depend on the character of the shore, *i.e.*, the Mangrove and Littoral Associations. All these are more or less modified in accordance with the special xerophytic conditions which distinguish Antigua from its more lofty neighbours.

THE PLANT ASSOCIATIONS OF ANTIGUA.

1. *The Mangrove Swamps.*—Many parts of the coast are shallow and swampy and are covered with Mangroves. This is specially the case on the leeward side of the island if the coast is low, as in the harbour of St. John's and the flat land lying to the north of it round Mackinnon's. *Rhizophora Mangle*, "*the*" Mangrove, abounds, growing in the water with its dense network of buttress and pillar roots and its seeds with their long protruding radicles. Scarcely in the water, but in very moist and swampy situations, where hardly anything else will grow, are two other Mangroves; one of these is the "Olive" Mangrove (*Avicennia nitida*), each bush surrounded by its mass of aerating roots, and with its leaves glistening with their coating of salt crystals. The other is the less known, but nevertheless common, *Laguncularia racemosa*, with its thick leaves turned edgewise to the sun on their reddish petioles. Yet further back, where it is possible to walk without extreme discomfort, comes *Conocarpus erectus*, showing a less degree of adaptability to sea-covered swamps than the other Mangroves; it is sometimes known as the West Indian Alder.

Only one other plant seems able to follow the Mangroves over the foul-smelling slime; this is *Batis maritima*, which, with its woody main stem, its green fleshy side shoots, and its leaves and flowers reduced to the barest minimum, is equally at home on dry coral sand and saturated mud. Other plants occur on the fringe of the swamps, or on the firmer sandy patches which are found here and there; they are chiefly sand dwellers. I have found *Sesuvium portulacastrum*, *Portulaca oleracea*, *Euphorbia buxifolia*, and even the xerophytic orchid *Oncidium Lemonianum*. The chief animals of these swamps are the little "Jumbie crabs," with one claw often larger than the rest of the body, which tunnel into the smelling mud in vast numbers; while on the firmer soil around are the large openings to the tunnels of the well-known land crabs. Wading birds such as yellowlegs, ringed plover, gaulins, etc., are common; but I have not found any plants which might be considered to have been brought by them from other islands, though such plants might be expected to occur chiefly in these muddy situations.

2. *The Littoral Region.*—This may be either a beach of white coral sand, such as is seen to perfection in James Bay, where a ridge of sand about 150 feet across separates the surf from a mangrove lagoon; or else a rocky shore continually drenched with salt spray, examples of which are well seen in the north of the island, especially on Iguana Island.

The sandy shore, which is composed almost entirely of coral and shell *débris*, all of which is calcium carbonate, has a well-defined Plant Association, almost as characteristic as the Mangrove Association. The trees, which flourish here in abundance, are the Manchineel (*Hippomane mancinella*), the Seaside Grape (*Coccoloba uvifera*), and the Seaside Mahoe (*Thespesia populnea*), all of which are undoubtedly part of the aboriginal Flora; to these the Coconut may be added. The shrubs include *Yucca aloifolia* (Spanish Needles), the Grey Nicker (*Cæsalpinia bonducella*), perhaps the Black and Brown Nickers, the Coco Plum (*Chrysobalanus Icaco*), and one or two shrubby Papilionatæ which I have not identified. Among the herbs which are commonly found are *Euphorbia buxifolia*, *Ipomœa pes-capræ*, *Sesuvium portulacastrum*, the hardy *Batis maritima*, Devil's or Bahamas Grass (*Cynodon Dactylon*), occasional examples of Burr Grass (*Cenchrus tribuloides*), and a kind of Marram Grass. *Portulaca oleracea* is very common as a weed in cultivated sandy soils, but does not appear to grow actually on the sea shore like the rest. Several Cassias belong to this Association, *C. ligustrina* being common; while the ubiquitous Dagger (*Agave americana*) also occurs on the sand.

The Plant Association for the rocks is less constant in character, but it includes such typical forms as *Sophora tomentosa* and the Seaside Tansy (*Borrichia arborescens*). The Loblolly (*Pisonia subcordata*) belongs here, although it sometimes occurs also on the sand, and close to the Mangroves in the swamps. *Pimenta acris* and the local "Wattle" are limestone plants which grow near the sea, while the widely-spread Prickly Pear and Turk's Head Cactus may also be classed here.

Some mention may be made of the limestone cliffs in Barbuda at Two Foot Bay, which are exposed to the full blast of the Atlantic; they have a most interesting Flora which would repay careful study (as indeed would that of the whole of Barbuda); the only member I was able to identify in a short visit was *Conocarpus procumbens*, which is not found in Antigua. The Flora at Two Foot Bay is unlike anything else in Barbuda and Antigua, or in the other islands which I have come across, the nearest approach to it being that found on certain precipitous and rugged hills in the Five Islands district not far from St. John's, the only town in the island; they belong perhaps to the particular limestone there known as Seaforth's,

3. *The Volcanic Region.*—The Flora of the low but rugged, andesitic, mountains consists mainly of shrubs and of Cactaceæ and allied plants. The common Prickly Pear (*Opuntia Tuna*) is abundant though not confined to this region; the little Prickly Pear, known locally as the "Sucker" (*Opuntia triacantha*) is found in large numbers near English Harbour, though not in other parts. It is "horrid with spines," and the oval stem pieces easily break off and adhere to one's boots and clothing. Very possibly this is a means of vegetative reproduction, for flowers and fruits seem to be rather infrequent in this species. Another Cactus typical of the region is the Turk's Head (*Melocactus communis*), which is specially abundant near the sea; while a new species of *Mammillaria* was recently discovered by Dr. Rose, of the Smithsonian Institute of New York. The tall Dildo (*Cereus insularis*) is abundant on the mountains, and also occurs on the limestone, as does Melocactus to some extent, especially in Barbuda (see above). The Frangipani (*Plumeria alba*) and the tall Dagger (*Agave americana*) are typical of this region, and present strongly xerophytic characters.

The shrubs include a few acacias and great quantities of Guava (*Psidiun Guajava*) and Cashew (*Anacardium occidentale*), which only occur in this area. The Logwood grows on many of the sheltered mountain sides, and so does the stately Cabbage Palm (*Oreodoxa regia*).

4. *The Antigua Limestone.*—The Flora of this region, while forming a distinct Association, nevertheless includes some plants which occur in the Littoral or Volcanic groups. The plants which are common to the Volcanic and Limestone Associations are the Prickly Pear (*Opuntia Tuna*), the Dildo (*Cereus insularis*), the Dagger (*Agave americana*) and the Logwood (*Hæmatoxylon campeachianum*). Plants which occur both on sandy shores and on the Limestone hills are the Seaside Grape (*Coccoloba uvifera*) and the wide-spread Dagger. The Seaside Grape is indeed as typical of hillside plants as of seashore plants. All the above are commonly found in this area as well as in the others mentioned. There are, however, a great number of plants which are almost entirely confined to this part of the island, or to the limestone hills, which crop out in certain parts of the Central Plain, especially at its western end near St. John's. These include *Pedilanthus tithymaloides*, known locally as the Milk Bush or Slipper Plant, a deadly poisonous species; two kinds of Thorn Apple or Wild Fire Bush (*Datura Stramonium* and *D. Metel*); the privet (*Clerodendron aculeatum*), beloved of humming-birds; the Wild Tamarind, which makes horses' tails drop out; and the Love Bush (*Bryophyllum calycinum*) with its thick fleshy leaves, which form buds so easily in the notches round the margin. *Tecoma stans* is frequently found, and so is a species of *Ficus* (? *F. religiosa*), with its small forest of stems like the Indian Banyan, and the White

Cedar (*Tecoma leucoxylon*). The Wild Balsam (? *Lantana*), with its thick yellow gum, is one of the most dominant plants. The Wild Pine (*Tillandsia utriculata*) and the Old Man's Beard (*Tillandsia usneoides*) are very common epiphytes, but they occur almost equally in the Central Plain; the Dodder (*Cuscuta* sp.) is chiefly, but exclusively, found in this area. In the Barbuda Limestone the Loblolly is very common and often bears a Misseltoe (*Loranthus*) upon it, but the Misseltoe is seldom (if ever) found in Antigua, while the Loblolly occurs mainly near the sea, and but seldom on the Limestone hills. The Castor Oil (*Ricinus communis*), a well-known member of this Flora, and the Soursop (*Anona muricata*) and the Papaw (*Carica Papaya*) occur as well as the wild Sage (*Lantana Camara*).

5. *The Central Plain.*—The Flora here includes many kinds of plants; there are the weeds of the canefields, the hygrophyllous and hydrophyllus plants of the ponds, and the trees and herbs found generally throughout the district. But *the* typical plant is the Acacia, which covers all the level clays, and which quickly invades a deserted piece of cultivated land, in most cases so overrunning it that the other wild plants hardly get a chance, except the Grasses. The commonest species appears to be *A. arabica*, but a number of species occur. The acacias are met with sometimes in the Limestone and Volcanic districts, but are never dominant except in the Central Plain.

A number of large trees are found, usually near small ponds or the beds of streams. Among them are the Antigua Whitewood (*Terminalia Buceras*), the huge Silk Cotton (*Eriodendron*), the Sandbox (*Hura crepitans*), and the "Evergreen," whose enormous roots frequently grow 100 feet in length in search of water. It is their power of abstracting water from dry soils which enables them to keep their leaves when other trees have shed theirs, thus earning their name. These spreading roots have caused serious damage to the foundations of the large stone church of St. Peter's, Parham. The Tamarind has quite established itself, too, but is not to be regarded as indigenous, and the same may be said for the Mahogany (*Swietenia Mahagoni*).

The ponds are always small, but usually manage to exist through the droughts; they are often covered by the Pond Weed and by *Nymphæa ampla*, which is indigenous, or by its rival, the Egyptian Lotus, which is ousting it in most places. The Water Violet (*Eichornia tricolor*) is also found, but, like the Lotus, has (probably) been introduced by human agency. Round the margins grow a yellow *Mimosa*, *Wedelia*, various Sedges (*Cyperus*), *Bambusa vulgaris*, the French Weed (*Commelina elegans*), *Crinum longiflorum*, the Wild Tobacco or Cattle Tongue (*Pluchea odorata*), and the Wild Cane (*Gynerium saccharoides*). *Ruellia tuberosa*, with its tuberous roots and explosive capsules, is also found in damp situations; it is known locally as Daniel's Great Gun. *Mimosa pudica*, which abounds in Trinidad, is never found in Antigua.

The pastures abound in herbs, many of which are Papilionaceæ;

among them are the Sweetheart (*Desmodium incanum*), *Crotalaria retusa*, *C. incana*, *C. seriacea*, *Cassia obtusifolia*, *Wedelia buphthalmoides*, *Stachytarpha cayennensis*, the Cankerberry (*Solanum bahamense*), the yellow *Mimosa*, Love-in-a-mist (*Passiflora fœtida*), and a *Euphorbia* (? *E. heterophylla*), with its bracts splashed with red. *Emilia sonchifolia* is one of the few examples of Compositæ.

A great number of plants occur mainly on the roadsides or among the canefields. In addition to *Argemone mexicana* and *Sonchus oleraceus*, many appear to be indigenous, being found in wild places as well as in the midst of cultivation. Many Ipomæas abound; there are numerous Leguminosæ, usually twining, such as the Wild Pea (*Centrosema virginianum*), the Winah (*Teramnus uncinatus*), and the Blue Pea (*Clitoria ternatea*); erect Papilionatæ include a *Phaseolus* and *Æschynomene americana*, which is sensitive, like Mimosa. Wild Lord Lavington (*Leonurus sibiricus*) and the Monkey Bush (*Abutilon indicum*) are common weeds, and the Whitehead (*Parthenium hysterophorus*) is extremely common, especially along roadsides. The Stinking Weed (*Cassia occidentalis*) is frequently found and several species of Salvia.

The flowers of the undoubtedly aboriginal plants are, on the whole, inconspicuous and not brightly coloured, though there are exceptions. With this may be correlated the absence of the gorgeous butterflies and moths found in most West Indian islands, those of Antigua being small and few in number.

UREDINALES OF NORTH DEVON.

By Norman G. Hadden.

As very little mycological field-work appears to have been done in North Devon, a list of the rust-fungi found there in July and August, 1915, may prove of some interest to other mycologists who intend to visit that charming district. All the species in the following list were obtained in the immediate neighbourhood of Lynton in July and August of this year, unless otherwise stated. It is, I venture to think, sufficient to show that the district is particularly rich in Uredinales. Several of the species recorded are looked upon as very uncommon in England, notably *Puccinia virgaureæ* Lib., *P. crepidis* Schröt., *P. hydrocotyles* Cooke, *Cronartium quercuum* Miyabe, and *Milesina blechni* Sydow. *Puccinia tinctoriæ* Magn. is apparently the second British record, but it has since been obtained in Worcestershire by Mr. Carleton Rea. *Uromyces striatus* Schröt. has apparently not been hitherto obtained in Britain on *Trifolium procumbens*, though it is known on the Continent on this host; *Quercus Ilex* similarly is a new British host for *Cronartium quercuum* Miyabe, of which the uredospores only occur in this country.

Mr. Carleton Rea has kindly verified all the determinations for me, except in the case of a few of the very common species.

The nomenclature adopted is that of Groves' *British Rust-Fungi*, 1913.

Uromyces valerianæ Fckl. Abundant.

U. flectens Lagerh. On *Trifolium repens*; not common.

U. striatus Schröt. On *T. procumbens*. Hollerday Hill and Lynbridge Lane.

U. fabæ De Bary. On *Lathyrus pratensis*; uncommon.

U. orobi Lév. On *Orobus tuberosus*. Lynbridge.

U. rumicis Wint. Common.

Puccinia virgaureæ Lib. Rare. Summerhouse Hill.

P. expansa Link. On *Senecio Jacobæa*; not uncommon.

P. carlinæ Jacky. Rare. Countisbury Hill.

P. tinctoriæ Magn. On *Serratula tinctoria*. Lee Bay; rare.

P. centaureæ DC. On *Centaurea nigra*; common.

P. cnici-oleracei Pers. On *Cirsium lanceolatum*; not uncommon.

P. obtegens Tul. and *P. lapsanæ* Fckl. Common.

P. hypochæridis Oud. Very abundant.

P. chondrillæ Corda. On *Lactuca muralis*. Lynbridge Lane.

P. taraxaci Plowr. Abundant.

P. crepidis Schröt. On *Crepis virens*. Near the station and near Brendon.

P. hieracii Mart. On *Hieracium murorum*; abundant.

P. difformis K. et S. On *Galium Aparine*; æcidia and teleutospores. Near Cheriton.

P. menthæ Pers. On *Mentha aquatica* and *Calamintha officinalis*; common.

P. glechomatis DC. On *Glechoma hederacea*; rare. Lynmouth.

P. annularis Schl. On *Teucrium Scorodonia*. Lee Woods and Model Gate; rare.

P. hydrocotyles Cooke. On *H. vulgaris*. Braunton Burrows.

P. saniculæ Grev. Woody Bay Woods; not common.

P. pimpinellæ Mart. On *Pimpinella Saxifraga*. Lydiate Lane; rare.

P. conii Fckl. On *Conium maculatum*. Bishop's Tawton.

P. circææ Pers. On *C. lutetiana*. Watersmeet and Lee Woods.

P. violæ DC. Abundant.

P. Fergussoni B. et Br. On *Viola palustris*. Exmoor; rare.

P. malvacearum Mont. On *Malva silvestris*; common.

P. umbilici Guep. On *Cotyledon Umbilicus*; very local.

P. lychnidearum Link. On *Lychnis diurna*; common.—Forma *arenariæ* Schum. On *Stellaria Holostea*. Lynbridge.

P. acetosæ Körn. On *Rumex Acetosa*; not uncommon.

P. obscura Schröt. Æcidia on *Bellis perennis*. Hollerday Hill.

P. oblongata Wint. On *Luzula maxima*. Lee Woods.

P. caricis Reb. On *Carex pendula*, &c. Lyndale and Exmoor.

P. graminis Pers. On various grasses; common.

P. coronata Corda. On *Holcus mollis*.

P. poarum Niels. Æcidia on *Tussilago Farfara*; not uncommon.

Phragmidium fragariastri Schröt. Not uncommon.

Ph. disciflorum Jones. On *Rosa arvensis*; common.

Ph. violaceum Wint. On *Rubus fruticosus*; abundant.

Ph. rubi-idæi Karst. On *R. idæus*; not common.

Kuehneola albida Magn. On *Rubus fruticosus*. Near Watersmeet.

Cronartium quercuum Miyabe. On *Quercus Ilex*. Hollerday Hill.

Coleosporium senecionis Fr. On *S. vulgaris* and *S. sylvaticus*; common.

C. tussilaginis Tul. On *Tussilago Farfara*. Hollerday Hill.

C. petasitis Lév. On *Petasites vulgaris*. Dean.

C. euphrasiæ Wint. On *E. officinalis* and *Rhinanthus Crista-galli*; common.

C. melampyri Karst. On *Melampyrum pratense*; not uncommon.

Melampsora larici-caprearum Kleb. On *Salix caprea*. Woody Bay.

M. euphorbiæ Cast. On *Euphorbia hiberna*. E. Lyn Valley; rare.

M. hypericorum Wint. On *Hypericum Androsæmum*; not uncommon.

M. lini Desm. On *Linum catharticum*. Hollerday Hill.

Melampsoridium betulinum Kleb. Common.

Pucciniastrum agrimoniæ Tranz. Hollerday Hill; rather rare.

Milesina dieteliana Magn. On *Polypodium vulgare*; uncommon.

M. blechni Sydow. On *Blechnum Spicant*. Watersmeet; rare.

M. scolopendrii Schröt. On *Scolopendrium vulgare*; not rare.

RUBUS FRUTICOSUS *LINN.*

By R. A. Rolfe, A.L.S.

The name *Rubus fruticosus*, L., which was formerly applied to one of our commonest and most characteristic British Brambles, has of late years been largely superseded by *R. ulmifolius*, *R. discolor*, and *R. rusticanus*, on the ground that the Linnean name represented an aggregate species, but an examination of all the materials shows that it must be restored,* as there can be no doubt as to the plant intended.

The name *Rubus fruticosus* appeared in the first edition of the 'Species Plantarum,' in 1753, where the habitat is given as "in sepibus præsertim maritimis Europæ," and a good specimen in the Linnean Herbarium proves conclusively that what Linnæus had in view was the plant afterwards figured by Sowerby as *R. fruticosus*, which itself, as already stated, is identical with the common and widely distributed plant that is included in modern

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* It is so restored in an aggregate sense in the British Museum *List of Seed-Plants* (p. 10). This paper aims at fixing its place as a segregate.

Floras under the names *R. ulmifolius* and *R. rusticanus.* The principal references cited by Linnæus are correct, and one of them includes a rude but quite characteristic figure of the plant under discussion. It may be interesting to repeat the characters and references given by Linnæus, the latter being somewhat amplified for the sake of clearness.

"5. *Rubus foliis quinato-digitatis ternatisque, caule petiolisque aculeatis*, L. Fl. Suec. ed. 1, p. 148, n. 409 (1745).

"*Rubus caule aculeato foliis ternatis ac quinatis*, L. Hort. Cliff., p. 192 (1731); Gronov. Fl. Virg. ed. 1, p. 78 (1742); Royen. Fl. Leyden. p. 273 (1740).

"*Rubus vulgaris sive rubus fructu nigro*, C. Bauh. Pinax, p. 479 (1671).

"*Rubus*, Camerar. in Matth. Epit. Util., p. 751, with fig.

"*β. Rubus vulgaris major, fructo albo*, Ray. Syn. Stirp. Meth. Brit., ed. 3, p. 467 (1724).

"*γ. Rubus flore albo pleno*, Magnol, Hort., p. 175 (1697)."

These references certainly include *R. fruticosus* as long afterwards understood, and as the only figure cited agrees with the plant in the Linnean Herbarium, and, moreover, as the habitat given is within the area of this common and widely distributed plant, there can be no reason for setting the original name aside merely because some of the references include something else. Some of these admixtures are entirely doubtful, as those covered by the citation from Bauhin, who is also quoted in most of the references given in paragraphs 1 and 2.

The inclusion of Fl. Suec. n. 409 has tended to obscure the issue, as it has been held that this refers to a Scandinavian plant, but the reference includes Bauhin's plant with all its confusion. The Scandinavian plant, which is a native of Central Scandinavia, Denmark, and North Germany, was afterwards described as *R. Wahlbergii* Arrhen. (Rub. Suec. p. 43), which Focke describes as intermediate between *R. cæsius* and *R. rhamnifolius*, while Sudre states that it is a hybrid between *R. villicaulis* × *cæsius.* In other respects it does not fulfil the requirements of the name *R. fruticosus*, L.

Another erroneous inclusion by Linnæus is that of the Virginian plant of Gronovius, which can be traced to its determination by the latter author as the plant of "Bauh. Pinax, 479." There are two original sheets of the plant of Gronovius in the British Museum Herbarium, and a comparison shows that they belong to *R. trivialis*, Michx. Fl. Amer. i, p. 296, a species that ranges from Virginia to Florida and west to Missouri and Texas.

Lastly, it may also be said that the two varieties of Linnæus may have to be excluded. Var. *β*, the white-fruited kind, is doubtful, for although there is an amber-fruited form of *R. fruticosus* (*var. leucocarpus*, Seringe in DC. Prodr. ii. p. 561) this one (*β*) is said to differ from the black-fruited form in having the leaves green beneath. Var. *γ*, the one with double white flowers, is probably *R. thyrsoideus*, Wimm. *var. flore pleno* (Gard. Chron. 1882, xviii, pp. 244, 245, fig. 35), also known in gardens as

R. fruticosus albus and *R. rosæflorus coronarius.* The double form of *R. fruticosus* (*R. bellidiflorus* Koch, Dendrol. i, p. 292), is well known as having pink flowers, with very numerous, narrow petals (Gard. Chron. 1878, x, pp. 240, 241, fig. 43).

Rubus ulmifolius, Schott, was described in 1818, being based on materials collected at Gibraltar. It may be interesting to repeat the short description, as the work is rather inaccessible. "*Rubus ulmifolius.* Fruticosus aculeatus, foliis quinatis ternatisque foliolis acuminatis, infra tomentosus, pedicellis calycibusque tomentosis, inermibus. Floribus amœne rosaceis. A *Rubo fruticoso* nostro, certe diversus. Hab. in montosis Gibraltariæ." This is quite clearly identical with the widely diffused plant which we have been considering. According to Major Wolley Dod, who remarks, "I can only distinguish one fairly constant species," it is common and often abundant in bushy places at Gibraltar.

We now come to the name *R. discolor*, under which the plant is frequently known, and as which it was figured by Boswell Syme, the figure being identical with the one given in the earlier edition of the work as *R. fruticosus*, L. *R. discolor* was originally described and figured by Weihe and Nees in 1824, from materials collected near Bonn, and the authors cite (Rub. Germ. v. p. 46) as a synonym, "*Rubus fruticosi varietates*, quæ plurimi auctorum laudant 'floribus roseis onatos.'" As to this *R. discolor* of Weihe and Nees, Focke says that only the figures C, D, and E belong to *R. discolor* as now understood, the greater part of the plate and some of the original specimens belonging to *R. hedycarpus*, Focke. The discrepancy is indeed obvious on comparison of the plate and specimens. Moreover, Weihe and Nees had already figured a white-petaled Rubus as *R. fruticosus*, L. (Rub. Germ. fasc. i, p. 24, t. 7), which is cited by Focke as *R. candicans*, Weihe. Babington accepted the name *R. discolor* for the common British plant, and observes (Brit. Rubi, p. 102), "The *R. fruticosus* of the Linn. Herb. consists of bits of this and of several other species"; this, however, is not borne out by an examination of the original sheet.

R. rusticanus, Merc., appeared in 1861, the author remarking: "Cette espèce si commune chez nous et dans les contrées méridionales de la France, en Italie et en Dalmatie, en Algérie, etc., n'est pas décrite dans les Rubi germanici de W. et N. parceque probablement elle disparaît dans les contrées septentrionales de l'Allemagne. . . . Je dois observer que le nom de *discolor* est appliqué encore à d'autres espèces dans l'Herbarium normale de Fries, dans la monographie d'Arrhenius, etc. Je l'ai trouvé dans diverses collections sous les noms de *dalmaticus*, d'*argenteus*. C'est bien certainement en partie le *Rubus fruticosus* de la Flore de De Candolle, de la Flora Helvétique de Gaudin, etc." The name was extended to the British plant by Focke (Journ. Bot. 1890, p. 129), and was afterwards used by Rogers.

The characters of the species are well described by Rogers. "Later in coming into bloom (by two or three weeks) than the vast majority of species, and usually among the last to abstain from flowering in the late autumn, or even up to mid-winter.

Generally recognisable at a glance by the very pruinose stem, large-based hooked panicle-prickles, and small white-felted obovate-cuspidate leaflets."

It is a very common and widely distributed plant. Rogers describes it as generally distributed in the lowlands of England, Wales, and Ireland, but rare in Scotland. On the Continent it is common in France, Belgium, the southern parts of the Netherlands, S.W. Switzerland, the Spanish peninsula, and the whole of the Mediterranean region, but in Germany, according to Focke, it is very local, in places near the western frontier. It also occurs in Madeira and the Azores, and extends eastwards as far as Afghanistan and the North-West Himalaya. As an introduced plant it occurs in New Zealand, where it is recorded as "plentiful throughout the colony"; also in Uruguay, Chili, and South Brazil.

According to the above view the following is the revised synonymy of the species, with such figures as we have been able to consult:—

Rubus fruticosus, L., Sp. Pl. ed. 1, p. 493 (1753); Lam., Encycl. Meth. ii, p. 548, t. 441, fig. 1–2; Fl. Dan. vii, t. 1163; Smith, Engl. Bot. x, t. 715; Schkuhr, Handb. ii, p. 50, t. 135, fig. h-l; Hayne, Gewachse, iii, t. 12; Guimpel, Holzgew. i, p. 136, t. 103; Duhamel, Traite Arb. vi, p. 71, t. 22.

R. ulmifolius, Schott in Isis, fasc. v, p. 821 (1818); Sudre, Rub. Eur., p. 69, t. 77; Focke in Bibl. Bot. lxvii, p. 153.

R. discolor, Weihe & Nees, Rub. Germ. v, p. 46, *ex parte*, t. 20, figs. c–e (1824); Syme, Engl. Bot. iii, p. 171, t. 447; Laguna, Fl. For. Esp., p. 246, t. 65; Bab., Brit. Rubi, p. 100.

R. rusticanus, Merc. in Reut. Cat. Pl. Vasc. Genève, ed. 2, p. 279 (1861); Focke in Journ. Bot. 1890, p. 129; Rogers, Handb. Brit. Rubi, p. 40.

THE PLANTS OF SALISBURY'S "PRODROMUS" (1796).

By James Britten, F.L.S.

In this Journal for 1886 (pp. 49, 296) I called attention to the unfair ignoring of Richard Anthony Salisbury's work by his contemporaries, and suggested that this was in great measure due to his personal unpopularity. For this there may have been, and probably were, reasons, and it must be admitted that Salisbury, in return, was unsparing in his criticism; but it is little to the credit of the botanists of the time that they should have allowed personal antipathy to lead them into a course of action which, from the point of view of Science, it is impossible to justify. It has been customary to explain their attitude as the result of the resentment felt at Salisbury's anticipation of Robert Brown's great paper on the *Proteaceæ* (Trans. Linn. Soc. x, 1810)—read before the Linnean Society at the meeting on January 17th, 1809, at which it is said that Salisbury was present—by the production of the botanical portion of the volume *On the Cultivation of . . . the Proteeæ* (1809), the ostensible author of which was Joseph Knight.* But the treatment of which Salisbury complained antedated this, and it may even have been that he considered he was but repeating, on a larger scale, the action of Smith towards himself.†

At a later period I pointed out (op. cit. 1914, p. 46) that the plant we had been accustomed to call *Romulea Columnæ* would have to take the earlier specific name *parviflora*, it having been described as *Ixia parviflora* by Salisbury in his *Prodromus* (1796). It then occurred to me that it might be worth while to examine Salisbury's work more closely, and this I have now done with results that seem to justify publication.

The most notable of these is the discovery that Salisbury's elaboration of the genus *Ixia* (pp. 33–39) has been almost entirely ignored, not only by his contemporaries but also by recent writers. Of this genus, which at the time of his writing was fashionable in cultivation, Salisbury describes and names thirty-two species. Of these the first two were by Linnæus, and are indeed always, placed under *Crocus;* the third is *I. parviflora* already mentioned. For ten, previously published descriptions are cited; but new names are given to most of them in accordance with Salisbury's practice throughout the book, which he explains and justifies in the preface (vi–viii), of substituting other names for those in the accepted nomenclature which he considered inappropriate. Seven described as new have been taken up, usually as synonyms, in subsequent publications. The remaining twelve,‡ save for the citation of their names from the *Prodromus* in the *Index Kewensis*, have been entirely ignored. They find no place in Gawler's list of "The Natural Order *Ensatæ*" (Ann. Bot. i. 29, 1804), nor in the same author's *Iridearum Genera* (1827), published under his later name Bellenden Ker; they are not referred to in Mr. J. G. Baker's *Handbook of the Irideæ* (1892), nor in his monograph of the order in *Flora Capensis*, vi. (1896); in the two last there is no evidence that the *Prodromus* itself was consulted. It is more than likely that some of these twelve species would now be regarded as synonyms or relegated to other genera, but the early date of Salisbury's book renders it probable that some at least of his specific names would take precedence of those at present in use. In thus calling the attention of future monographers to these overlooked species, it may be useful to add that vol. viii of the collection of Salisbury's

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* See Journ. Bot. 1886, 296.

† See tom. cit. 50: Parad. Lond. t. 117 (1868). In his copy of Salisbury's *Paradisus Londinensis* Smith scribbled an epigram which I am not sure has been printed:

"What malice lurks beneath this fair disguise
Satan once more steals into Paradise.
But now how plausible soe'er his tale is
We always take his words *cum grano salis*."

‡ Their names are *ambigua, concinna, conspicua, erosa, fallax, fugax, lineata, mutabilis, propinqua, reticularis, socialis, tardiflora.*

MSS. and drawings* in the Department of Botany is entirely occupied by *Amaryllidaceæ*, among which are many sketches and notes on the genus. The copy of the *Prodromus* in the Department contains a few corrections in Salisbury's hand.

The following notes mostly refer either to names which have been overlooked by monographers, or which take precedence of those adopted by authors; in the former case Salisbury's description of the species is transcribed for the convenience of those who do not possess the book, the arrangement of which is followed.

POA PULCHELLA (p. 21).

"P. foliorum laminis supra retrorsum scabris: stipulis brevissimis ciliatis: paniculâ spiciformi densissimâ: spiculis 9–12 floris: glumis obtusis, interiore minore carinis 2–ciliatis.

"Sponte nascentem prope Tranquebar, legit Joh. Ger. Kœnig."

This is not taken up in the *Flora of British India.*

GLADIOLUS PULCHELLUS (p. 39).

"G. foliis valde tortis: limbo tubo $\frac{2}{3}$ longiore, paulo supra medium 6-fido; laciniis patentibus, spatulæformibus, 3 superioribus parum approximatis: stigmatibus 2-fidis. Corolla dilute rubra."

WACHENDORFIA PALLIDA and W. LUGUBRIS (p. 45) are practically undescribed.

PLANTAGO FALCIFOLIA (p. 47) is referred to in Ind. Kew., no doubt correctly, to *P. carnosa* Lam. Illustr. i. 341—a name which it may possibly antedate, as the date of Lamarck's publication has not been ascertained (see Journ. Bot., 1906, 319): an earlier name than Salisbury's, however, is *P. hirsuta* Thunb. (Fl. Cap. 29, 1794). Salisbury's description is based on a specimen collected at the Cape by Masson, from whom we have specimens of *P. carnosa.* Salisbury's name is not taken up in the *Flora Capensis.*

BANKSIA TENUIFOLIA (p. 50) is an accepted synonym of *Hakea acicularis* R. Br. The name was applied by Du Mont de Courset (*Le Botaniste Cultivateur*, v. 107, 1805) to a cultivated plant, of which he does not describe the flowers; another equally imperfect description is given of *H. longiflora.* Bentham (op. cit., 495) who quotes the species from Roem. & Schulth. Syst. iii. 425 (1818), speaks of these as "garden plants described only as to their foliage, and quite insufficiently for recognition." Both are retained in *Index Kewensis*, the latter being cited from the second edition of De Courset's work; both, however, stand side by side in the first edition: *H. tenuifolia* is misprinted *H. tenuiflora* in Ind. Kew, Under these circumstances it would seem that Salisbury's trivial name should be restored, and the plant will be called

HAKEA TENUIFOLIA (Salisb.) comb. nov.
Banksia tenuifolia Salisb. Prodr. 50 (1796).
Conchium aciculare Vent. Jard. Malm. (1804), t. 111.

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* This collection would repay greater attention than it has hitherto received; the descriptions in Salisbury's very small but legible hand are often very full, and his drawings are numerous and careful. Besides the nine bound volumes, there are also in the Department a number of unbound MSS. which might be worth consultation.

Hakea acicularis R. Br. in Trans. Linn. Soc. x. 181 (1810); Fl. Austral. v. 514.

BANKSIA TERETIFOLIA (p. 51). The trivial name takes precedence of that usually accepted:

HAKEA TERETIFOLIA (Salisb.) comb. nov.
Banksia teretifolia Salisb. Prodr. 51 (1796).
Hakea glabra H. A. Schrader, Sert. Hann., p. 27 (1797).
H. pugioniformis Cav. in Anal. Nat. Hist. i. 213 (1800); Benth. Fl. Austral. v. 506 et auct. plur.
Conchium teretifolium Gaertn. f. Fruct. iii. 217 (1805).

BANKSIA SERRATIFOLIA (p. 51) antedates *B. æmula* R. Br. in Linn. Trans. x. 240 (1810): Brown (l.c.) cites Salisbury's name with doubt, but Bentham (Fl. Austral. v. 556) places it as a synonym of *B. æmula.*

PRIMULA MOSCHATA (p. 118).

"P. foliis lanceolatis, dentatis, margine præsertim farinosis: floribus erectis: calycibus campanulatis: corollæ limbo angusto plano; filamentis basi ipsâ tubi insertis. Tota herba Moschi odore gravi prædita."

The only reference I have found to this is in *Das Pflanzenreich*, iv. (237), p. 130. where Pax and Knuth place it among "species incomplete descriptæ, vix recognoscendæ."

CONVOLVULUS SAXATILIS (p. 124). It was shown in Journ. Bot. 1904, 176, that this is the earliest name for the plant also known as *C. suffruticosus* Ait. (1810), *C. suberosus* Willd. (1813), and *C. Massoni* F. G. Dietr. (1816).

PLUMERIA INODORA (p. 148).

"P. foliorum laminis oblongo-lanceolatis, acuminulatis; bracteis retusis cum acumine lato: corollæ limbo tubo 1½ longiore; laciniis parum inæquilateralibus, ellipticis, retusis."

Salisbury does not cite Jacquin for this name, which is published in Enum. Pl. Carib. 13 (1760), with a very incomplete diagnosis: "Plumeria frutescens; caudice in paucissimos ramos diviso"; and it is not possible to ascertain whether he had the same plant in view. Salisbury's plant does not seem to have been taken up as distinct and is not entered in Ind. Kew., so that its identity with Jacquin's seems to have been assumed.

CONYZA SESSILIFLORA (p. 195),

"C. foliorum laminis late obovatis integerrimis, obtusis, incano-pubescentibus: capitulis solitariis, secundis, subaxillaribus, sessilibus.

"Ex Ins. Bourbon auct. Jac. Lee.

"Valde singularis stirps, potissimum structurâ pappi, exterioris brevissimi paleacei erosuli, interioris longissimi pilosi."

This does not appear to have been anywhere taken up.

CALENDULA GLAUCA (p. 209).

"C. foliis anguste spatulæformibus, minute ciliatis: calycibus viscidulo-hirsutis: flosculis radii aurantiacis, sterilibus."

The name is not taken up in DC. Prodr., nor, so far as I know, elsewhere: it is probably a form of *C. officinalis*.

ARCTOTIS PROSTRATA (p. 210).

The name is not taken up in Fl. Capensis, but is universally accepted as a synonym of *A. repens* Jacq. (1798). The plant is now placed under *Arctotheca* and will stand as

ARCTOTHECA PROSTRATA (Salisb.) comb. nov.
Arctotis prostrata Salisb. Prodr. 210 (1796).
Arctotis repens Jacq. Hort. Schoenbr. iii. 306 (1798).
Arctotheca repens Wendl. Bot. Beobacht. 41 (1791); Harv. and Sond. Fl. Cap. iii. 467.

NARCISSUS (pp. 220–225). As in the case of *Ixia*, it is probable that some of Salisbury's names will ultimately take precedence of those at present generally adopted, but this must be left to monographers of the genus, who will consult in connection with it the treatment of the genus by Salisbury in Trans. Hort. Soc. i. 304–366 and in his *Genera*, pp. 98–138. Vol. viii. of his drawings contains a large number of figures and descriptions, with numerous specimens, illustrating the genus: for those relating to the *poeticus* section Mr. Pugsley's paper issued as the second Supplement to this Journal for 1915 may be consulted. In his monograph of the *Amaryllidaceæ*, Mr. Baker does not seem to have quoted the *Prodromus* at first hand, as Salisbury's species—*amplus*, *exiguus*, *obvallaris*, *pulchellus*, *pumilus*, *tubæformis*—are not taken up therein.

SPERGULA PALLIDA (p. 298).

I am indebted to Mr. N. E. Brown for identifying this plant, which is retained in Ind. Kew. without equivalent. Salisbury based the species, of which he gives a long description, upon a specimen from Vaillant. The name involves a new combination, as under: it will be observed that G. Don, who first placed the plant in *Spergularia*, took up Salisbury's name.

LEPIGONUM PALLIDUM (Salisb.) comb. nov.
Spergula pallida Salisb. Prodr. 298 (1796).
Arenaria glandulosa Jacq. Hort. Schoenbr. iii. 56 (1798).
Spergularia pallida G. Don, Gen. Syst. i. 425 (1831).
Spergularia glandulosa Heynh. Nomencl. ii. 689 (1840), pro parte.
Lepigonum marginatum Koch var. β. glandulosa Sond. in Harv. and Sond. Fl. Cap. i. 135 (1859).
Lepigonum glandulosum Kindb. in Nov. Act. Upsal. iv (1863).

ERICA JASMINIFLORA (p. 293) is cited in Fl. Cap. (iv. 193) as from Trans. Linn. Soc. vi. 382 (1802). A number of small specimens from Salisbury illustrating this paper, his principal work on the genus, are in Herb. Mus. Brit., with numerous drawings of details not by Salisbury but often bearing notes in his hand, as do also the sheets in the Banksian Herbarium. Sketches by Salisbury himself will be found in vol. iii of his drawings.

ERICA PENICILLIFORMIS (p. 297). This takes precedence of *E. calyculata* Wendl. to which it is referred in Fl. Cap. iv. 1. 248. In Ind. Kew. Salisbury's later name *penicillata* is retained and *penicilliformis* is given as a doubtful synonym; there can, however, be no doubt as to this. The name would stand:

ERICA PENICILLIFORMIS Salisb. Prodr. 297 (1796).
E. calyculata Wendl. Eric. Ic. fasc. 4, 5 (1798?)*; Fl. Cap. iv. 1, 248.
E. penicillata Salisb. in Trans. Linn. Soc. vi. 348.

LAURUS ABBREVIATA (p. 344).

"L. caule glabro: foliorum laminis obovatis, subbus glaucis: pedunculis foliis multoties brevioribus: corolla 1½ lineam longis.

"Ex South Carolina auct. Jac. Lee."

This description seems to have escaped the notice of U. S. botanists, who are likely to find that Salisbury's trivial must be retained.

LEPTOSPERMUM POLYGALÆFOLIUM (p. 350) antedates *L. flavescens* Sm. in Trans. Linn. Soc. iii. 262 (1797) to which Bentham (Fl. Austral. iii. 104) refers it as a synonym. L. AUSTRALE Salisb. (l. c.) also antedates *L. lanigerum* Sm., but the latter stands, on account of *Philadelphus laniger* Ait. (Hort. Kew. ii. 156 (1789) which, however, is not cited by Bentham.

METROSIDEROS (pp. 351, 352). Of the seven species of this genus, six, founded on specimens collected by David Burton at Port Jackson, are (very briefly) described as new.

M. HYPERICIFOLIA is in Fl. Austral. iii. 131 attributed to Smith (in Trans. Linn. Soc. iii. 279 (1797), but Salisbury must stand as the authority. M. PROCERA and M. PROPINQUA are doubtfully cited by Bentham as synonyms of *Syncarpia laurifolia* Ten. (1839). If this be correct, *procera* will have to be adopted as the specific name; if not, Smith's trivial (*glomulifera*, op. cit. 269) must be substituted for *laurifolia*. The decision may be left to future workers at the genus.

M. APOCYNIFOLIA is antedated by *M. costata* Gaertn., cited by Cavanilles as a synonym of his *Angophora lanceolata* adopted by Bentham (op. cit. 184). The name will be

ANGOPHORA COSTATA (Gaertn.) comb. nov.
Metrosideros costata Gaertn. Fruct. i, 171 (1788).
M. apocynifolia Salisb. Prodr. 351 (1796).
Angophora lanceolata Cav. Ic. iv. 22 (1797).

M. DECORA is now referred to *Melaleuca*, in which genus it will take Salisbury's name:

MELALEUCA DECORA (Salisb.) comb. nov.
Metrosideros decora Salisb. Prodr. 352 (1796).
M. genistifolia Sm. in Trans. Linn. Soc. iii. 277 (1797): Benth. Fl. Austral. iii. 143.

M. AROMATICA is a doubtful plant; see Fl. Austral. iii. 268.

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* I have not been able to verify this reference, but the publication of the work did not begin until 1798.

ROSA SIMPLICIFOLIA (p. 359). A misleading passage in Lindley's *Rosarum Monographiæ* (p. 2) suggests that Salisbury's name should be adopted by those who hold stricter views than Lindley did on questions of priority: "Although Mr. Salisbury's name," he says, "was published before Pallas's, and as Sir James Smith observes, much the best; yet, as *berberifolia* has been almost universally adopted, I should scarcely be justified in giving up expediency to a right of priority which, moreover, is supported only by the antecedency of a few months."* A reference to Pallas's establishment of *berberifolia* (in Nov. Act. Acad. Petrop. x. 379) shows that this dates from 1792, thus antedating *simplicifolia* by four years, Salisbury writes: "Descriptionem ad exemplar ditissimi Herbarii Banksiani concinnavi": the specimen, however, collected in Persia by Michaux, is very small, and the description (which is very full) was doubtless supplemented from living plants, as Salisbury tells us he had had it in his garden for two years.

POTERIUM AUSTRALE (p. 360) "Sponte nascentem juxta Port Desire, legit — Christie." This name, although cited in DC. Prodr. ii. 592 as a synonym of *Acæna sericea* Jacq. is not quoted in his monograph of the genus (1911) by Dr. Bitter, who employs the name for a subspecies of *A. ovalifolia* R. & P. The species will stand as

ACÆNA AUSTRALIS (Salisb.) comb. nov.
Poterium australe Salisb. Prodr. 360 (1796).
Acæna sericea Jacq. Eclog. i. 81 (1811–16) et auct.

KNOWLTONIA RIGIDA (p. 372). Although Salisbury's specific name has been generally maintained for the genus which he here established, it is clear that the plant must take the Linnean trivial, which was restored by Huth in 1890: see Ind. Kew. Supp. i. 234, where, however, the identity of *K. capensis* with *K. rigida* is not indicated. The name stands as:

KNOWLTONIA CAPENSIS (L.) Huth in Abh. & Vortr. Gesamt. geb. Naturw. iii. 69 (1890).
Adonis capensis L. Sp. Pl. 548 (1753).
Knowltonia rigida Salisb. Prodr. 372 (1796).

ULMUS (p. 391). The names (as species) assigned by Salisbury to plants entered in Ait. Hort. Kew. (i. 319) as varieties of *U. campestris* are not cited in the *Cambridge Flora*: they are

PROCERA = U. campestris α vulgaris.
ANGUSTIFOLIA = ,, ,, β stricta.
LATIFOLIA = ,, ,, γ latifolia.

Of the last he says: "Procul dubio species est, in Yorkshire passim vere spontanea." With regard to the second, if the identity of Aiton's variety with *U. stricta* Lindl. be accepted, it would seem that *U. angustifolia* Salisb. would take precedence, unless that be barred by *U. angustifolia* Moench Verz. Ansl. Baeume, 137 (1785). The matter is one for workers at the genus to consider. Dr. Moss tells me that he had a reason for not taking up Salisbury's name, but he does not remember what it was. It may be noted that there are stillborn names in Salix (p. 393) and Populus (395) which are not quoted in the Camb. Flora synonymy.

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* This principle, under the plea of "convenience," at one time found countenance and defence at Kew: see Journ. Bot. 1892, 53.

Quercus sessiliflora (p. 392). This is the first publication of this name; Mr. Wilmott calls my attention to the fact that in Salisbury's reference—"Mart. Fl. Rust. n. 10, t. 11 et an t. 12?"—the doubt should apply to the former rather than to the latter plate.

A few other notes made while going through the *Prodromus* may be added here.

It is not easy to distinguish the names of collectors from whom Salisbury himself received specimens from those cited in the books which he quotes. It would seem, however, that among the former were Roger Shakespear (fl. 1777–83), once referred to as Robert, Jamaica; Masson (1749–1800?), Cape; James Lee (1715–95), Bourbon, Cape, and Australia; R. Finlay, Jersey; George Brooks, Honduras; and Benjamin Hussey, Falkland Islands (1737): of the three last I have no further information. Salisbury also acknowledges help "ex Herbario amicissimi Smith" * (p. 57), and from Banks: *Conyza anthelmintica* "inter numerosas stirpes est quas amicissino Banks debeo, cui sat gratum omnium plane nunquam testari possum" (p. 194). He also speaks warmly of the help he had received from André Thouin (1747–1824); under *Artedia squamata* (p. 161) he writes: "Inter alia rarissima dona celeberrimi Thouin cujus in me benevolentiam hic reticere nequeo." Salisbury probably made Thouin's acquaintance when in Paris in 1786, in which year he went to visit his patron Miss Anna Salisbury,† who was living at Montpelier; in the *Prodromus* he mentions having in this year collected plants there and in Languedoc. He also gives localities for four English plants: *Cerastium arvense* ("prope Wentbridge [Yorks] collibus calcareis abunde legi," p. 300); *Geranium sanguineum* and *Pimpinella dioica* (*Trinia glauca*) near Bristol; and *Cineraria integrifolia* ("in collibus calcareis prope Stamford abunde legi," p. 200). There is a pretty note on *Veronica Chamædrys*: "In nostra insula, margines viarum et sepium adulto vere fere ubique ornat, colore florum Ætheri sereno vix cedente, peramabilis planta" (p. 92).

In view of the general neglect of the *Prodromus*, it may be well to point out that it contains many critical notes and full descriptions of species: as an example of the former may be instanced that on *Oxalis ambigua* (*stricta* L.) of which he says "Confuderunt hanc cum præcedente [*pusilla* (*corniculata* L.)] auctores, ut nuperrime Swartz, distinguas tamen a solo Toro prominente" (p. 323).

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* At this period the relations between Smith and Salisbury were still cordial; it was in the same year that the former named the genus *Salisburia* "in honour of Richard Anthony Salisbury Esq., of whose acuteness and indefatigable zeal in the service of botany no testimony is necessary in this Society, nor in any place which his writings have reached:" Trans. Linn. Soc. iii, 331.

† This is not the place to enter into Salisbury's domestic history; material for so doing, which is briefly summarised in Dict. Nat. Biogr. l. 193, will be found in the Banksian Correspondence in the Department of Botany, vol. x (2).

SHORT NOTES.

NEPETA GLECHOMA forma PARVIFLORA IN HEREFORDSHIRE.—I found this plant on June 4, 1915, growing luxuriantly on the top of Marcle Hill, on a high, exposed ridge of Aymestry limestone (Silurian). I believe this to be the first record of the occurrence of the small-flowered form in v.-c. 36. The type was also growing in the short turf of the hilltop. The chief points of contrast are: The low, diffuse growth of the type, with flowering stem 6 to 8 cm. high; and the tall, upright, crowded growth of the form, with stems of 20–25 cm., mostly 22 cm. high. The length of the corolla in the type is 18 mm., and in the form 5 mm.; also the latter plant is only slightly hairy, less so than in the type. Thus it is quite different from the grey, hoary plant I described under the above name in this Journal for 1913, p. 253. Mr. Marshall kindly corrected the name on p. 306 of the same volume, calling it the var. *hirsuta*, which is thus a British form, its habitat being Merrow Downs, Surrey. *Hirsuta* was also a micranthous form, and both have pistillate flowers only, the stamens being absent. Thus these are only sex-forms and unworthy of varietal rank. Dr. Moss tells me that many other *Labiatæ* exhibit this phenomenon of gyno-diœcism.—ELEONORA ARMITAGE.

JUNCUS TENUIS IN DORSET.—This plant is now known for several localities in the Bristol district, where it has turned up since the publication of *The Flora of Bristol* (1912). It may now be added to the Dorset Flora; on June 10th, 1914, I came across it in fine condition and some quantity on Lilliput Common near Poole Harbour. The common has lately been disturbed for golfing purposes, and seeds may have been introduced inadvertently with the grasses which were sown in certain places. It is intermingled with *Juncus bufonius*, *J. squarrosus*, *J. effusus*, *J. conglomeratus*, *J. sylvaticus*, *Rynchospora alba*, some Carices, and other vegetation. I also gathered the plant on waste ground at Poole. In revisiting these habitats in June of this year I was glad to note that the Lilliput plants were as vigorous as ever, but those of the waste ground at Poole had entirely disappeared.—C. B. GREEN.

SORBUS.—Botanists who have been puzzled by the various forms of *Sorbus* in this country, or elsewhere, will agree with Mr. Marshall's remark (p. 14) that "evidently much further study of the British *Sorbi* is needed." They will also agree with his first paragraph, in which he points out it is difficult to see why in Britain "this group should be ranged with the apples and pears, in view of their marked difference in flowers, fruit, and foliage." Mr. Marshall had so much to do with the drawing up of the last edition of the *London Catalogue*, edited by Mr. Hanbury, that it is all the more surprising that in that list the word *Sorbus* is conspicuous by its absence. Students desiring further useful notes on this genus will find helpful matter in Mr. White's admirable *Flore of Bristol* (under *Pyrus*); in the *Flore de la Suisse*, by Schinz and Keller; and, to go back to 1853, in the excellent *Flore du Jura*, by Godet. Indeed, my excuse for this note is to draw the attention of British botanists to this little-known book, containing 860 pp. of good descriptions in French of all the families, genera, and species of Phanerogams and Ferns found in the French and Swiss Jura. A second edition with supplement was published in two volumes in 1869. Like Mr. White's volume, the *Flore du Jura* contains many illuminating notes and observations. Godet's work preceded in 1851 by an "Enumeration"; in the finished work we are told that much additional help was supplied by the English botanist R. J. Shuttleworth.—H. S. THOMPSON.

RUSCUS ACULEATUS L.—This species is usually described as diœcious. Hooker says of the genus, "subdiœcious shrubs." A note in Journ. Bot. (1870, 10) records male and female flowers on some plants. In my neighbourhood the species is frequent, and plentiful in some places, apparently always female. Berries are scarce, and, so far, I have failed to discover either male plants or male organs on female plants. Wishing to obtain a male plant to fertilise the luxuriant bushes in my shrubbery, I sowed seeds in the spring of 1912, but no seedling developed till the spring of 1915. Do the seeds require heat to germinate? The flowering period is described by Syme, E. B., as early spring. Hooker says February to April. I can find flowers expanded every December, and have seen them in November when I have looked for them. Mr. Clement Reid told me several years ago that he had seen the flowers out in November year after year. What other British species bears flowers and the fruit of the previous season at the same time?—E. F. LINTON.

CENTAURIUM MARITIMUM IN CORFU.—This pretty species grew on a knoll near Camone in April, 1914, with other interesting species, including *Linum pubescens* Russ., *Orchis commutata* Tod., *Serapias occultata* Gay, and *S. Lingua* L. It is not included for Corfu in Halàcsy's Flora, but is given on the authority of Pieri from Ipso in that island in the Supplement.—G. CLARIDGE DRUCE.

REVIEW.

Illustrations of the New Zealand Flora. Edited by T. F. CHEESEMAN, F.L.S., F.Z.S., Curator of the Auckland Museum, with the assistance of W. B. Hemsley, F.R.S., late Assistant Director of the Royal Gardens, Kew. The plates drawn by Miss Matilda Smith, of the Royal Herbarium, Kew. Published under the Authority of the Government of New Zealand. Wellington, N.Z. John Mackay, Government Printer, Wellington. 1914. Two volumes, 4to, tt. 250. [No price stated.]

It rarely falls to the lot of the reviewer to have to notice a work so thoroughly satisfactory in every respect as this, or one of which it is possible to say that in any way it could not have been better done; yet this, after spending a pleasant and instructive afternoon in turning over its pictures and pages, is the verdict which we pronounce upon this exceedingly handsome book. That the botany would be thoroughly well done, Mr. Cheeseman's name is sufficient guarantee; that the illustrations would be careful and accurate was to be expected from one who has already contributed nearly five thousand plates to numerous publications: yet it is possible to be accurate without being interesting, and Mr. Cheeseman contrives to be both, while we are inclined to agree that " the plates contained in these volumes will enhance [Miss Matilda Smith's] already well-earned reputation"; this, we think, is due to some extent to the admirable way in which they have been put upon the stone by Mr. J. N. Fitch, who has infused into them something of his uncle's grace and freedom of treatment—qualities sometimes a little lacking in Miss Smith's work.

The volumes are, of course, primarily associated with Mr. Cheeseman's *Manual of the New Zealand Flora* (1906), and on that account it has been possible to omit the strictly scientific description of the species figured, the space thus gained being devoted to matters of general interest connected with each. Some years ago, permission was granted by the Trustees of the British Museum to allow the reproduction in a reduced form of the folio plates engraved on copper to accompany Solander's descriptions of the plants collected during Cook's first visit to New Zealand in 1769, and a set of impressions from these plates was transmitted to New Zealand; but it is matter for congratulation that it was decided not to use these, but to provide a series specially drawn for the work.

Avoiding, then, the matter published in the *Manual*, Mr. Cheeseman has mentioned under each species the facts connected with its first discovery, and is thus enabled " to draw attention to those pioneers of botanical exploration to whom our first knowledge of flora is due, and to whom sufficient credit has never been given." The distribution within, and, in the case of non-endemic species without, the Dominion is given; matters relating to economic value or local tradition are added, as well as facts of scientific interest. In this way a thoroughly readable account of each species is presented, and the book will thus interest many who would be repelled by merely technical descriptions.

It would be impossible in a necessarily brief notice to give any indication of the numerous points of interest presented, but a few notes made while turning over the pages may be worth transcribing. Mr. Cheeseman is well acquainted with the plants of Banks and Solander, of which duplicates from their collections in the National Herbarium were sent to New Zealand, and with the unpublished descriptions of the latter; these, with the plants of the Forsters, are constantly referred to, and some hitherto unpublished names are, we think undesirably, printed.

Among the Cruciferæ we note a plant, first referred by Mr.

Cheeseman, its discoverer, to *Cardamine* and later to *Nasturtium* (*N. latesiliqua*), which he thinks will probably, with others, form a distinct genus; he modestly, however, refrains from establishing this on the ground that before doing so it would be necessary to compare the whole of the genera of the *Arabideæ*, "a work which can hardly be properly carried out without access to the large public herbaria and libraries of Europe." If such restraint were more generally exercised—and that not only in the colonies—the aggregate of new species published in a given year would be as much lower as their value would be higher. *Lepidium oleraceum*, which proved of such value as an anti-scorbutic to the crews under Cook and later under Forster, can hardly be said to be a plentiful species at the present time, and Mr. Cheeseman knows of few localities where "boat-loads," as remarked by Cook, could be collected. Another *Lepidium* (*L. sisymbrioides*) is remarkable for its stout cylindrical root, sometimes quite 4 ft. in length and as thick as the finger, its size seeming altogether out of proportion to the short stems; with this Dr. Thellung unites two other species, but "no New Zealand botanist familiar with their appearance in the field will agree with this view."

Mr. Cheeseman's reluctance to differentiate genera is equalled by his unwillingness to add to synonymy; he points out that *Aristotelia racemosa* must take the earliest specific name bestowed upon it by the Forsters, but says, "I hesitate to make a change which will inevitably cause much confusion and from which little advantage can be derived." The change, however, will have to be made and might as well have been done now; the same may be said as to *Angelica montana* (t. 68).

Under *Geranium Traversii*, a plant of the Chatham Islands which has not yet been collected on any part of the mainland, is an interesting note: "It is a remarkable fact that not less than 30 species of flowering plants are confined to the Chatham Islands, the total flora of which, including both the phanerogams and vascular cryptogams, does not exceed 220 species. The percentage of endemic species is thus rather over 14 per cent. A ratio so large as this cannot be said to offer much support to the theory so often advanced of the connection of the islands in New Zealand during Pliocene times."

Among Maori food-plants of special interest may be named the "Hinau" (*Elæocarpus dentatus*) and "Karaka" (*Corynocarpus lævigata*)—the latter, which is structurally also of great botanical interest, of prime importance before the arrival of Europeans. The preparation of these is described. The juicy berries of *Coriaria ruscifolia* ("Tutu"), notwithstanding the poisonous properties of the plant, yield a pleasant beverage: Mr. Cheeseman describes finding almost half the population of one of the islands engaged in collecting the berries and straining the juice.

In the Umbelliferæ, which are largely represented, the remarkable genus *Aciphylla* is represented by three species, a fourth (*A. Dieffenbachii*) having lately been raised by Mr. Cheeseman to generic rank, as *Coxella*.

The genus *Stilbocarpa* (Araliaceæ), of which three species are described, is "one of the most interesting found in the New Zealand area, from the point of view of geographical distribution; it has no near allies," and "its affinities appear to be sufficient to preclude the possibility of the genus having developed anywhere close to its present area of distribution. Consequently, the problem of what its ancestry has been, from what lands it has wandered, and how it arrived in its present habitat, become questions of some moment; and although answers cannot be supplied at the present time, we may hope that patient inquiry and observation may yet supply them." Under *Panax anomalum*, Mr. Cheeseman, having called attention to the close resemblance between this and a considerable number of plants of widely separated families, remarks: "To my mind, all attempts that have been made to explain why a number of plants of diverse relationships should have assumed a form so closely similar that they can hardly be distinguished without minute investigation, or, in short, why they should apparently mimic a common standard of growth and habit, have fallen far short of solving the difficulties of the case. No sufficient reason has also been given for the curious fact that so many of these plants grow intermixed in large numbers, in some cases favouring special associations of their own, and that their chief habitat is in alluvial soils or along the banks of rivers." In the same order is the remarkable *Meryta Sinclairii*, confined to two small groups of islands,

In Compositæ, the genera *Olearia* and *Celmisia*, each containing plants of much beauty, figure extensively. The remarkable colouring of *C. Traversii* is thus described: "The upper surface of the leaf is dark brownish-green; the under-surface and margins are clothed with a rich and soft bright ferruginous tomentum; the midrib beneath and petiole are purple: while the leaf-sheath is covered with lax snow-white tomentum. When to a tuft of leaves like the above are added from two to six stout scapes also clothed with ferruginous tomentum, and bearing flowers sometimes 2 in. in diameter, it may well be imagined that the plant is one which would arrest the attention of the most incurious traveller." There is an excellent description of the cushions of *Raoulia eximia*, the large woolly masses of which, with those of *Haastia pulvinaris*, have, from their appearance, been appropriately styled "vegetable sheep."

The five plates of *Gentiana* (three of them Mr. Cheeseman's species) are valuable in view of the treatment the New Zealand species have received at the hands not only of F. von Mueller, but of J. D. Hooker and Bentham, all of whom, "dealing solely with dried specimens," have arrived at combinations "which every field botanist in New Zealand finds himself unable to agree with."

"From a scientific point of view the most interesting plant found in the Chatham Islands," to which it is confined, is *Myosotidium nobile*: it is certainly one of the most beautiful, and, oddly enough, first became known through specimens cultivated in England. At one time an abundant coastal plant in the Chathams, it has now become rare, partly owing to sheep, which feed on its leaves, and partly to pigs, which root up and devour the fleshy rhizomes.

Calceolaria Sinclairii is interesting as representing a genus —*Fuchsia* is another—found only in South America and New Zealand, forming a striking proof of the relationship of the two floras. Ten of the numerous and characteristic endemic Veronicas are represented, including the remarkable *V. tetragona* and *V. cupressoides*, in which the branchlets mimic, as it were, those of a cypress: *V. tetragona* was actually figured in mistake for a *Podocarpus*; *V. lycopodioides* has much the aspect of several lycopods with oppressed scale-like leaves; *V. salicornioides* was named on account of the likeness of its branchlets to those of a species of *Salicornia.*

A very full description, an amplification of that given in the *Manual*, is given of the remarkable *Dactylanthus Taylori* (Balanophoraceæ).

Homolanthus polyandrus (Euphorbiaceæ) is only known from Raoul (or Sunday) Island, where it is now restricted to a few localities inaccessible to goats, who eat the bark as high as they can reach it, thus causing the death of the tree.

The longest description in the work is that of the "Kauri" (*Agathis australis*), to which seven pages are devoted. The remarkable appearance of the forests is described, with their associated vegetation; various considerations lead to the conclusion: "May we not reasonably surmise that the Kauri forests which clothed the north of New Zealand at the beginning of the Pleistocene period were very similar in composition and appearance to those now living? Proof of this supposition may not be obtainable at the present time, but there are many indications to support it."

Among Monocotyledons the numerous figures of terrestrial orchids are of special interest, while those of *Carex* and other Cyperaceæ, and of Grasses, are exceedingly useful. The vascular Cryptogams are represented by seventeen ferns and a *Lycopodium.*

As an appendix is given a list of illustrations which appeared prior to the book, followed by an excellent general index. It remains to be said that the book is admirably printed, the typographical arrangements leaving nothing to be desired. It is suitably bound, and lies open flat on the table—it is, in fact, in every way creditable to all who have been concerned in its production.

BOOK-NOTES, NEWS, &c.

Dr. Edward Gillett Gilbert was born at Harleston, Norfolk, on March 12, 1849, to which county his ancestors had removed from Yorkshire in the sixteenth century. He studied medicine at Leeds, and afterwards came to London, where he had a large practice, from which he retired in 1895 and took up his residence at Tunbridge Wells, where he died on December 17. Here he took a warm interest in the Natural History Society, of which he was successively secretary and vice-president, and devoted himself to the careful study of Rubi, especially of the *Suberecti* section; on these he published papers in this Journal for 1907 and 1912. His views as to their hybridity were somewhat severely criticised, but he maintained that his observations confirmed his conclusions, which he thought found further support in his large series of specimens. He had previously raised the question of hybridity in a paper, also criticised, on "The Oxlip, Cowslip, and Primrose," in this Journal for 1903, based on observations made at Montreux in that year.

Alfred Stanley Marsh was killed in France on January 5th, 1916. He was but twenty-four years of age at his death. Going up to Cambridge as an Exhibitioner of Trinity in 1909, he became a Senior Scholar in 1911. His university career was very successful; he obtained a double first, and was awarded the Potts Exhibition at Trinity and the Frank Smart Studentship. He was acting as temporary demonstrator at the Botany School, Cambridge, when war broke out. After some training he was gazetted to the 8th Somerset Light Infantry, and at the time of his death had reached the rank of captain. Marsh had published a couple of papers on plant anatomy in 1914, and last year an account of the maritime ecology of Holme, Norfolk. Readers of this Journal will recollect his valuable account of *Azolla* which was reprinted in 1914 (pp. 209–213) from the *Proceedings of the Cambridge Philosophical Society*. Marsh was a very good field botanist both from the old and from the new standpoint, and a splendid companion in the field. By his death British Botany suffers a great loss, as there can be no doubt that a career begun with such promise would have been highly successful. J. R.

At the meeting of the Linnean Society on December 16th, 1915, Mr. T. A. Dymes read a paper "On the Seed-mass and Dispersal of *Helleborus fœtidus*, Linn.," summarised as follows: The seeds of *H. fœtidus*, L., are remarkable in being shed from the follicle in a single mass, bound more or less tightly together by a thick, white ventral strip of oleaginous tissue. This is the elaiosome of Sernander, and it is of raphal origin. Owing to the contrast of the shining elaiosome with the almost black seeds, the mass as a whole bears, at a short distance, a deceptive resemblance to the larva of a beetle. Observations were made, over two consecutive nights, on the work of the snails, which disintegrate the mass by devouring the elaiosome, thus reducing it eventually to single seeds. Experiments were also made with a view to establishing the possibilty of molluscan dispersal of single seeds over a short distance. Observations in nature, and on captive *Helix aspersa*, point to the conclusion that the elaiosome offers an attraction as a molluscan dainty in the way of food. Experiments in the open do not support the idea of the larval resemblance being an adaptation to ornithochory, or that there is any regular dispersal by the birds of the neighbourhood. Observations and experiments with the ants *Donisthorpea nigra* and *Myrmica lævinodis*, prove that they carry off whole masses, fragments, and single seeds, and take them into the nest. On the other hand, their behaviour does not favour the suggestion that the larval "mimicry" is operative, as far as they are concerned. The claim to myrmecochory is not a valid one. As far as the ants are concerned, neither the larval resemblance nor the massing brings to the species any advantage which it would not possess if the seeds were shed singly, as is usually, if not universally, the case with those that are adapted to these insects. The larval resemblance, which cannot be denied, suggests an adaptation to some still unrecognised agent or agents, and observations at the distributional headquarters of the species are much to be desired, in order to clear up the mystery of the mass.

THE contents of the last part (vol. vi, part 2, not dated) of the *Transactions of the Perthshire Society of Natural Science* are almost entirely botanical. Mr. W. Barclay, the President, contributes critical notes on *Rosa mollis*, *R. involuta*, *R. glauca*, and *R. coriifolia*. Mr. Henry Coates has an interesting account, with numerous illustrations from photographs, on "The Evolution of Plant Life on a Haughland": "a haughland may be defined as a flat stretch of land, occupying the floor of a valley, bordering the stream which flows down that valley, and rising in a succession of steps or terraces as we recede from the stream towards the slopes which form the true sides of the valley." Mr. Frank Scott writes on "The Natural Regeneration of Woods."

The latest part of the *Flora Batava* (M. Nijhoff, 's Gravenhage) contains twenty excellent plates in colour, with accompanying letterpress in Dutch and French, the diagnoses being in Latin. The flowering plants figured, which include several introductions, are *Rubus diversifolius*, *Carex axillaris*, *Viola calcarata*, *Melilotus macrocarpa*, *Rumex maximus*, *R. aquaticus*, *Briza minor*, *Reseda alba* (which we hardly regard as of anything but casual occurrence "dans l'Angleterre méridionale") *Bromus arvensis* var. *velutinus*, *Iva xanthiifolia*, *Crepis pulchra*; the remainder are *Azolla filiculoides*, *Coprinus lagopus*, *Cordyceps ophioglossoides*, *Stereum hirsutum*, *Collybia tuberosa*, *Tricholoma putidum*, *Reticularia Lycoperdon*, *Geaster Bryantii*, and *Ceriomyces albus*.

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EUPHRASIA NEMOROSA AND E. CURTA.

By Eric Drabble, D.Sc., F.L.S.

Many British Euphrasias submitted to the referees in this genus by the two Exchange Clubs have been named *E. curta* var. *glabrescens* Wettst. In this naming I have several times concurred, but in a few cases have suggested that they ought to be called *E. nemorosa*, in spite of a slight hairiness of the leaves. A prolonged study of these plants in the field and in the herbarium has led to the conclusion that two distinct plants have been distributed under the name *curta* var. *glabrescens*—(i) a slightly hairy form of *curta*—*i. e.* the true *curta* var. *glabrescens* of Wettstein's Monograph; and (ii) a form of *nemorosa* with slight hairiness of leaf and bract, especially on the margins, and occasionally with some hairs on the calyx, usually marginal only.

Wettstein's descriptions of *nemorosa* and *curta* are given below.

E. nemorosa Persoon* (Synopsis ii. p. 149, 1807) pro var. —Gremli, Neue Beit.I.S. 18, 1880.—" Caulis erectus crassus rarissime simplex, plerumque in parte inferiore usque ad medium caulis vel solum in media parte ramosus, 7–40 cm. altus, rubescens vel fuscescens, pilis crispulis reversis eglandulosis pubescens, hinc inde glabrescens vel bifariam pubescens, in parte inferiore foliis deciduis mox denudatus, ramis erectis, sæpe iterum ramosis, oppositis. Folia infima obtusa, utrinque dentibus 1–3 obtusis, media et superiora ovata vel ovato-lanceolata opposita acuta, medio fere latissima, utrinque dentibus acutis, sed non aristatis 4–7. Bracteæ suboppositæ latitudine folia caulina superantes, sed breviores, basin versus latissimæ, utrinque dentibus 4–6 acutissimis vel breviter aristatis, patentes vel subarcuato-recurvæ. Folia omnia viridia, glaberrima in speciminibus siccatis griseo-viridia, non nitida, subtus plicata. Spica initio condensata, mox elongata. Flores subsessiles. Calyx glaber, fructifer subinflatus, dentibus brevibus. Corolla cca. 5 mm. longa, labio superiore bilobo, lobis minute denticulatis, labio inferiore trilobo, lobis emarginatis, extus hirsuta, albida labio superiore cœruleo picta et macula lutea striisque cœruleis in labio inferiore vel tota plus minus cœrulea. Capsula cuneato-obovata, matura calycem æquans vel (sæpius) superans, emarginata, margine longe ciliata, ceterum pilosa vel glabra " (p. 118).

E. curta Fries (Novit. Flor. Suec. ed. 2, p. 198, 1828) pro var. —" Caulis erectus, crassus, rarius tenuis, plerumque in parte inferiore usque ad medium caulis ramosus, 3–40 cm. altus (plerumque cca. 10 cm.), rubescens vel fuscescens, pilis crispulis albis reversis pubescens, ramis erectis vel erecto-patentibus, hinc inde iterum ramosis oppositis. Folia infima obtusa, utrinque dentibus 1–3 obtusis, media et superiora ovata opposita acuta, basin versus latissima, utrinque dentibus acutis, sed non aristatis 4–7. Bracteæ suboppositæ latitudine folia caulina superantes sed breviores, sæpe fere orbiculares, utrinque dentibus 4–7 acutis non aristatis vel in aristam brevem abeuntibus, patentes vel arcuato-recurvæ. Folia omnia griseo-viridia, in speciminibus siccatis infra rugosa, apicem caulis versus sæpe smaragdino-nigricantia, in pagina superiore et inferiore setulis albis dense hirsuta vel pubescentia reducta saltem in regione marginali paginæ superioris, in margine et in nervis paginæ inferioris setulis parvis obsita. Spica initio condensata, mox, sed raro valde, elongata; flores subsessiles. Calyx totus vel saltem in margine et nervis albo-setulosus, fructifer subinflatus, dentibus brevibus. Corolla ca. 4–5 mm. longa, labio superiore bilobo, lobis emarginatis vel denticulatis, labio inferiore trilobo, lobis emarginatis, albida striis cœruleis et macula lutea in labio inferiore notata, rarius tota cœrulea vel amethystina. Capsula cuneato-obovata, matura calycem æquans vel parum superans, truncata vel subemarginata, margine longe ciliata, ceterum pilosa rarius glabra" (p. 128).

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* Townsend (Monog. Sp. Euphrasia, Journ. Bot., 1897) quotes this plant as *E. nemorosa* H. de Martius. On this matter see Townsend, *op. cit.*, p. 405, and Wettstein (Monog. Euphrasia, Leipsig, 1896), p. 118.

The principal differences between the two species are these: *Nemorosa* is usually a taller plant with more upright branches, those of *curta* often spreading considerably; the bracts of *nemorosa* are less rounded; the leaves and bracts of *nemorosa* are green and quite glabrous, and plicate beneath, those of *curta* grey-green owing to the dense hairy covering, and somewhat rugose beneath, especially in the dried condition; the teeth of the bracts are more acute in *nemorosa;* the inflorescence of *nemorosa* lengthens considerably after flowering, this feature being much less marked or even absent in *curta;* the calyx of *nemorosa* is glabrous, that of *curta* densely hairy all over, or on margins and ribs alone; the capsule of *nemorosa* is said to be emarginate, that of *curta* subemarginate or truncate, but I have failed to convince myself that there is any constant difference in this respect, the capsules of both plants being subject to variation.

From several localities plants have been obtained agreeing in all respects with *curta*, except that leaves, bracts, and calyces are only slightly hairy. They seem without doubt to be *curta* var. *glabrescens* Wettstein (*Monog.*, p. 133).

Far more abundantly, however, I have found plants agreeing in all respects with *nemorosa*, except that the leaves and bracts are slightly hairy, generally on the margins only, and that the calyx also may bear some marginal and occasionally surface hairs. These seem without doubt to be merely forms of *nemorosa*.

Wettstein points out that the distributional areas of *nemorosa* and *curta* are different, the area of *nemorosa* being more southerly than that of *curta*. He says that where these areas are in contact *nemorosa* sometimes shows the first traces of trichomes on the leaf margin. These areas are in contact through England, as shown in the map of distribution (*Mon.*, Karte I). It is therefore to be expected that these slightly hairy forms of *nemorosa* should occur in this country.

A careful examination of the plants in my own herbarium has failed to find any absolutely glabrous-leaved plants of *nemorosa*, and it may be indeed that in England this plant is generally slightly hairy, perhaps often rather more so than in the plants with which Wettstein was familiar. This hairiness, however, as Wettstein himself implies, does not make these plants *curta* var. *glabrescens*, this last-named plant being something other than merely slightly hairy *nemorosa*.

If a name is necessary, the following may be suggested:

E. NEMOROSA var. CILIATA nov. var., a *nemorosa* typica diagnoscitur foliis bracteisque, raro et calycibus ciliatis vel leviter hirsutis.

In my opinion, however, it would be better to extend the diagnosis of *nemorosa* to read: "Folia omnia . . . glaberrima rarius ciliata vel leviter hirsuta . . . Calyx glaber rarissime ciliata vel leviter hirsuta . . ."

The possibility of a hybrid origin of both these slightly hairy forms must not be overlooked. The hairy *nemorosa* form, at least, however, grows in great quantities in districts from which both *curta* and ordinary glabrous *nemorosa* appear to be absent entirely, and thus its hybrid nature seems so extremely unlikely that it need not be further considered.

Localities of the Plants in my Herbarium.

E. curta H. Mart.—CUMBERLAND: Helvellyn, Grisedale. ISLE OF MAN: Ramsey. YORKSHIRE: Teesdale.

E. curta var. *glabrescens* Wettst.—CUMBERLAND: Grisedale. YORKSHIRE: Teesdale. DERBYSHIRE: Big Moor. CARNARVONSHIRE: Cwm Idwal.

E. nemorosa var. *ciliata* mihi.—LANCASHIRE: Freshfield. CHESHIRE: Chester, Wallasey. DERBYSHIRE: Arborlow, Monsall Dale, Ashover, Wooley Moor, Holmesfield, Scarcliffe Park Wood. CARNARVONSHIRE: Llandudno. HERTFORDSHIRE: Potters Crouch. ESSEX: Leigh-on-Sea. CORNWALL: Truro, Bodmin Road, St. Agnes, St. Endellion, St. Erth, Pencallenick, Woodbury.

A NEW HYBRID WILLOW-HERB.

By the Rev. E. S. Marshall, M.A., F.L.S.

EPILOBIUM HIRSUTUM × PALUSTRE, n. hybr. (× E. WATERFALLII).

Plantæ hujus pars superior tantum a me visa est. Caulis ramosissima, tenuior, teres, villosa. Folia sessilia, lineari-lanceolata, admodum villoso-pubescentia, margine plus minus revoluto; media subintegra, superiora denticulata. Flores majores; sepala anguste lanceolata, apiculata, petalis speciosis saturato roseis subduplo breviora. Capsulæ abbreviatæ, graciles, villosissimæ. Semina sterilia.

I have only seen the upper part of this plant. Stem much branched, rather slender, villous, terete. Leaves sessile, linear-lanceolate, somewhat villous-hairy, with more or less revolute edges; the middle ones subentire, the upper denticulate. Flowers rather large; sepals narrow-lanceolate, apiculate, about half as long as the showy, deep rose petals. Capsules short, slender, very villous. Seeds sterile.

This very interesting addition to our Flora was gathered by Mr. Charles Waterfall, of Chester, on August 4th, 1915, by the swampy edge of a pool near Helsby Station, about seven miles from that city. It well combines the characters of both parents, which grew close by. The large flowers, denticulate upper leaves, and shaggy clothing are clearly due to *E. hirsutum*; and the influence of *E. palustre* is no less plain. The irregular, shrunken, shortened capsules and imperfect seeds leave no doubt as to its hybrid origin.

Professor Haussknecht, in his *Monographie der Gattung Epilobium*, p. 63, describes a supposed *E. hirsutum* × *palustre*, found by Schmalhausen at Kaporja, near St. Petersburg, but remarks: "I have not yet seen any specimens of this alleged combination; and, indeed, the description has not convinced me of its existence." In a letter he informed me that he had since seen an example, and that it proved to be *E. palustre* × *parviflorum*.

Mr. Waterfall writes that he has sent a specimen to the National Herbarium, Cromwell Road.

NOTES ON THE NOMENCLATURE OF FUNGI.

II.—On the Writing of Specific Names.

By John Ramsbottom, M.A., F.L.S.

Judging from the writings of mycologists and from the enquiries one receives, there seems to be much doubt as to the method of writing a specific name derived from the name of the host plant —*e.g.* in *Puccinia Violæ*, should there be an initial capital? As this method of naming is the most common in fungi, the parasitic groups such as the *Uredineæ* having about 90 per cent. of their specific names so derived, it may ensure more uniformity if the bearing of the International Rules of Botanical Nomenclature on the point be understood.

In the case of fungi there is not the same trouble as there is in phanerogams, where it is often a matter of historical and literary research to discover whether a given specific name has any relation to a former generic name. The same Recommendation (X) refers, however, to both cases: "Specific names begin with a small letter except those which are taken from names of persons (substantives or adjectives) or those which are taken from generic names (substantives or adjectives)." No fungus names are given amongst the examples. There can be no doubt that a specific name which is a genitive of a generic name is "taken from" that generic name, though one imagines that the phrase is not quite so restricted as was intended. The interpretation of the Recommendation for fungi is seen, however, on referring to Recommendation XV bis, where among the examples we find *Puccinia Hieracii* and *Pucciniastrum Epilobii*, and to Art. 49 bis, where *Polythrincium Trifolii*, *Diaporthe Ailanthi*, etc., occur.

III. Cystopus v. Albugo.

The generic names *Cystopus* and *Albugo* are apparently used indiscriminately by mycologists. It seems advisable to point out which name is to be adopted in accordance with the International Rules of Botanical Nomenclature, and to give a few historical facts.

The first species of the genus which was described was the common "white rust" of cruciferous plants which was named *Aecidium candidum* by Persoon in Gmelin's Syst. Nat. ii, 1473 (1791). The same author in Usteri's *Annalen der Botanik* xv, 16 (1795) proposed the genus *Uredo* to include this fungus and two new species. *Uredo candida* is given as having two varieties "*α*, *difformis* in caule et foliis *Thlaspeos Bursae Pastoris* Lin., nec non in foliis *Tragopogi porrifolii*" and "*β*, *orbicularis minor*, in foliis *Cheiranthi incani*." In describing a specimen on *Capsella Bursa pastoris*, Persoon mentions the distortion of the plant and the bursting of the epidermis, but states that after a few days, when most of the spores have been dispersed, a *Botrytis*-like form arises in the same place, and he is uncertain whether this is not to be regarded as the mature form of the described species. This *Botrytis* (*B. parasitica* = *Peronospora parasitica* Tul.) is described and figured in Persoon's *Observationes Mycologicae* though the author is apparently still in doubt as to whether it is the cause of the distortion of the host-plant etc. or whether there are two fungi concerned—the result is that *Uredo candida* is omitted!* In his *Synopsis Fungorum* (1801), on the contrary, the *Botrytis* is omitted and the *U. candida* again appears. The genus *Uredo* had by this time grown so much that it is divided into four sections the third of which is *Albugo*, characterised by having white spores. (*Uredo candida*: α, *U. Thlaspeos*, β, *U. Tragopogi*, γ, *U. Alyssi*, *Uredo Cheiranthi*.)

Roussel (Fl. Calvados, ed. ii, p. 47 (1806)) raised this section to generic rank but has only one species, *Albugo candida*, of which there is no diagnosis but which is stated to occur on Cruciferae, *Humulus* etc. indicating that the author had not a very clear idea of the genus. Gray (Nat. Arr. Brit. pl. ii, 540 (1821)) also uses the name *Albugo* generically and includes three species, *Albugo cruciferarum* (=α, *U. Thlaspeos*), *A. tragopogi* and *A. petroselini*. Although Gray had a clear conception of the genus, his names, as in so many other cases, were disregarded at the time. Fries in his *Systema Mycologicum* does not mention any of the species of "white rust"; in fact his treatment of the microscopic fungi as a whole is much inferior to that of Persoon.

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* See Journ. Bot. 1915, 277.

Leveillé's genus *Cystopus* was not founded until 1847 (Ann. Sci. Nat. 3rd sér. viii, p. 371). It included "*Uredo candida* Pers., *U. cubica* Mart., *U. Portulacae* DC., *U. Bliti* Bivon., *U. floriformis* Mérat, etc." but no combinations were made.

Meanwhile Prévost (1807) had written a remarkable paper on the structure and germination of species of *Uredo* and similar fungi. In the case of *U. Portulacae* he found that the spores after being immersed for a time in water gave rise to zoospores—"un globule immédiatement suivi de trois, quatre, cinq ou six autres, qui se réunissent au moment même en un peloton, et qui se meuvent quelques temps ensemble, le peloton se balançant ou tournant horizontalement sur lui-même, ou roulant dans le liquide." Tulasne endeavoured to repeat the experiment but, strange to say, this skilled mycologist failed, and in 1855 still placed *Cystopus* in the Uredineae § Albuginei. Other investigators met with no greater success until de Bary in 1860 (Ann. Sci. Nat. 4th sér. xiii, p. 236) confirmed Prévost's results and was able to point out the affinities of the genus. Three years later the same author (*op. cit.* xx. p. 14 (1863)) records the presence of sexual organs which had escaped the notice of previous observers. He revises the genus (*tom. cit.* p. 31) giving an account of conidia, zoospores, oogonia, antheridia and oospores. Specimens with a descriptive label including a description of the oospores were distributed by de Bary in Rabenhorst's *Fungi Europaei Exsiccata*, ed. ii, ser. ii. Cent. 5, 1862 (*Cystopus spinulosus* n. sp. 479, *C. cubicus* 480, *C. Portulacae* 481, *C. candidus* 482 and *C. Lepigoni* n. sp. 483).

The name *Cystopus* was used by all mycologists until Kunze (1891) in his *Revisio Generum Plantarum*, ii, p. 658, revived the name *Albugo* on the ground of priority, taking *Uredo candida* as the type of the genus. He used the name *Cystopus* for a genus of Orchids: (*Cystopus* Blume, Orch. Archip. Ind. 82 (1858)); most American and continental authors have adopted the generic name *Albugo* since that time. It is clear, however, that according to the Rules, *Cystopus* is the correct generic name as, although *Albugo* has priority it antedates Fries' *Systema Mycologicum* which is the starting-point for the nomenclature of Phycomycetes.

There is some difficulty when one comes to consider the names to be applied to the species. If we regard the genus as beginning with Leveillé at least two new combinations will have to be made in our five British species. As an example, the synonymy of the species universally known as *Cystopus* (or *Albugo*) *Portulacae* may be cited:

Uredo Portulacae DC. *Fl. fr.* ii. 88 (1815).
Erysibe quadrata Wallr. *Fl. crypt. germ.* ii. 194 (1833).
Uredo candida Pers. var. Portulacearum *Rabenh. Kryptfl.* i, 13 (1844).
"U. Portulacae DC." (under *Cystopus*) Lév. in *Ann. Sci. Nat.* 3rd sér. viii, 371 (1847).
Cystopus Portulacae de Bary in Rabenh. *Fung. europ.* No. 481 (1862); *Ann. Sci. Nat.* 4th sér. xx, 31 (1863).
Albugo Portulacae O. Kuntze *Rev. Gen.* pl. ii, 656 (1891).

From this it will be seen that the earliest specific name after Fries's *Systema* is "quadrata," and on the grounds of priority alone a new combination would have to be made. This kind of thing occurs in other genera of the Phycomycetes. Referring to Art. 49 bis of the International Rules * it will be seen that Phycomycetes are not mentioned, and from the wording (which is open to criticism on other grounds) it would appear that they were not even considered. In the case of *Syzygites* and *Sporodinia*, the spore forms are so distinct in appearance and in origin that they received different generic and specific names; there can be no hesitation in considering the zygote to correspond to what it has been agreed to call the "perfect form" and to have therefore the prior right to a name. Many Oomycetes were given names in their conidial stage but in the great majority of cases the oosporic stage was not discovered until the doctrine of pleomorphy was becoming firmly established, and hence did not receive a new name although the two kinds of spore are very different. If the oospore had received a different generic (or even specific) name, that name would clearly have to stand. In the special case under discussion the oospore stage was first described by de Bary, and as it was recognised to be the same fungus as that of which the conidial state had received the name *Cystopus*, the same name was used. In other words the name of the conidial stage is *Cystopus* Lév. and the name of the oosporic (or perfect) stage is *Cystopus* de Bary. Therefore the specific names must begin with de Bary.

This is the logical way of looking at the question, and it has the additional merit of retaining the majority of the names in common use in the Phycomycetes owing to the fact that a knowledge of the sexual stage was gained principally by the efforts of Tulasne and de Bary, and the names used by these distinguished investigators were naturally generally adopted. Thus de Bary's names, *Cystopus candidus*, *C. Lepigoni*, *C. Portulacae* and *C. Bliti* have been generally used by British mycologists. The remaining species usually known as *C. Tragopogonis* should be called *C. cubicus*.

CYSTOPUS CUBICUS Lév. emend de Bary *in* Rabenh. *Fung. Europ.* No. 480 (1862); *Ann. Sci. Nat.* 4th sér. xx, 132 (1863).

Uredo candida Pers. β Tragopogi Pers. *Syn.*, 223 (1801).

U. obtusata Link in *Mag. natarf. Freunde*, Berlin, iii, 6 (1809).

U. cubica Strauss, *Wetterau. Ges. f. Naturk.* ii, 86 (1810).

U. Tragopogi DC., *Fl. fr.* ii, 237 (1815).

Albugo Tragopogi S. F. Gray, *Nat. Arr. Brit. Pl.* ii, 540 (1821).

Uredo candida b. compositarum, Rabenh. *Kryptfl.*, i, 13 (1844).

Uredo (Cystopus) cubica Lév. in *Ann. Sci. Nat.*, 3rd sér., viii, 371 (1847).

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* Cf. Journ. Bot. 1915, 302.

Cystopus Tragopogonis Schroet. *Kryptfl. Schles. Pilz.* 234 (1886).

? C. spinulosus de Bary in Rabenh. *Fung. Europ.*, No. 479 (1862); *Ann. Sci. Nat.*, 4th sér., xx, 133 (1863).

ROUSSEAU AS BOTANIST.

By Bruce Cummings.

In his early days, Jean Jacques Rousseau sampled most of the good things in the intellectual larder, and more than once—like a mischievous boy—brought the jampot down on his head. He read anatomy until he fancied he had "a polypus at the heart." A mixture of "quicklime, orpiment and water" exploded in his face, and so put a short term to his researches in experimental physics. In astronomy and geology his studies were equally short, and we may be sure that he was the least likely person to resume his struggles with the science of numbers at the bidding of the facetious lady of Venice, who, it will be remembered, made him a present of this sound advice: "Lascia le donne e studia le matematiche."

At the time when Rousseau was one of the remarkable *ménage* at Les Charmettes, the study of botany, one day to become his master passion, made no appeal to him. Nay, he despised it, considering botany as a subject fit merely for an apothecary, and Rousseau's opinion of apothecaries and physicians was at no time very high. Madam de Warens herself was a herbalist rather than a botanist, and that silent devotee, Claude Anet, was originally taken into her service because he was a herbalist and because Madame thought it convenient to have among her domestics someone with a knowledge of drugs.

Botany therefore became confounded in Rousseau's mind with anatomy and medicine, and served only to afford him frequent opportunities for pleasantries at Madam de Warens's expense, in this way earning for himself a friendly box on the ears.

But even in those days of high contemptuous youth, Rousseau was sometimes persuaded, at the beck of Madam de Warens, to bend his head over a plant, while "Mama" pointed out to him a thousand natural beauties which greatly amused him and should have made him a botanist.* "But the time was not yet, and my attention was arrested by too many other studies"—by music in particular.

It was more than twenty years later that Rousseau's slumbering interest in botany burst into the flame of real passion. By this time he was a refugee from France and Geneva, and had settled down at length in Motiers, one of the villages standing in the Val de Travers, a valley between the gorges of the Jura and the Lake of Neuchâtel. Here, big with desire for "a knowledge of every known plant on the globe," he began with an attempt to commit to memory the whole of the *Regnum vegetabile* of Murray! Little wonder that, clad in his Armenian costume and breathing from mouth and nostrils (one almost believes) the fires of his fanatical zeal for plants, this remarkable botanist—surely the most remarkable in the history of the science!—was generally held by the villagers to be some evilly disposed medicine man who sought for noxious herbs and who was confidently believed to have poisoned a man in Motiers who died in the agonies of nephritic colic.

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* During a walk at Cressier in 1764 Rousseau noticed a Periwinkle growing among some undergrowth and was immediately transported in memory back to his old friend Madam de Warens, and to the incident when she drew his attention to a specimen of the plant some thirty years before. From this circumstance the Periwinkle, in France, came to be the emblem of the pleasures of memory and sincere friendship.

On several other counts also, the inhabitants did not take kindly to the strange philosopher, and their dislike at length reached a climax manifested by the arrival of a large stone, flung by a vigorous arm through the door into his room, where, fortunately, it fell dead at the philosopher's feet. A little later, J. J., "as timid and shy as a virgin," as he himself assures us, quitted inhospitable Motiers for the Island of St. Pierre in the lake of Bienne, where his life for several months was an idyll, well suited to his virginal character. Most readers of Rousseau will remember his delightful description of this brief sojourn in *Les Réveries d'un Promeneur Solitaire.*

Having sent for his Theresa, who arrived at his summons with all his books and effects, the botanist recommenced his scientific labours. There was ample opportunity. With the customary hyperbolical turn of phrase that makes us love him, Rousseau relates how, armed with the *Systema Naturæ* of Linnaeus and a magnifying glass, he wandered over the island determined to leave not a blade of grass unanalysed, and murmuring to himself, in ecstatic repetition, the only prayer of an inarticulate old lady —"Oh"—which drew from the Bishop the encomium: "Good mother, continue thus to pray: your prayer is better than ours."

Rousseau's idea was to write a monograph of all the plants on the island, a purpose quickly overthrown by the receipt, presently, from the Goverment of Berne of a peremptory notice to quit. And so the Flora Petrinsularis was never written.

Accepting David Hume's invitation to visit England, J. J. is soon settled among the Derbyshire hills, and, at Wootton, took immense delight in climbing the surrounding heights in search of curious mosses, convinced at last that the discovery of a single new plant was a hundred times more delightful than to have the whole human race listening to his sermons for half an hour. What more can science require of a man?

After the break with Hume, Rousseau, by this time certainly a victim of persecution mania, fled back to France, and lived for some time under the tutelage of the Prince de Conti at Trye, near Gisors. Here he continued his botanical studies and the writing of the *Confessions*, in a state of seraphic happiness so long as he was able unmolested to make long collecting excursions, to classify and arrange his herbarium or to watch the growth of some specimen from the seed. "Parvenu dans les lieux," he wrote, "où je ne vois nulles traces d'hommes je respire plus à mon aise comme dans un asyle où leur haine ne me poursuit plus."

Later on, he was accompanied by Bernardin de St. Pierre in these country rambles. "We had gone through part of a wood," writes Bernardin in an account of one of their joint excursions, "when, in the midst of the solitude, we perceived two young girls, one of whom was arranging the other's hair." It is not unfair to inquire if the amorous J. J., before a scene like this, felt no temporary vacillation in his allegiance to the science of botany.

While staying at Grenoble, during the course of a botanical excursion with one Sieur Bovier, an advocate of that place, whom our solitary walker, as a mark of especial confidence, had invited to accompany him, Rousseau presently began to refresh himself by eating the fruit of a plant, the Sieur meanwhile remaining at his side, without imitating him and without saying anything. Suddenly a stranger, newly arrived, exclaimed: "Ah, Monsieur, what are you doing? Don't you know that fruit is poisonous?"

"Why did you not warn me?" Rousseau inquired of the Sieur.

"Oh, Monsieur," said he, "I dared not take that liberty."

Rousseau smiled at the fellow's "Dauphinoise humilité," and suffered no ill effects from his little collation.

At first one is inclined to think that J. J.'s interest in botany was only another of his many "affairs de cœur." Closer examination soon shows that it was something more. His book on the elements of botany, consisting of a series of letters addressed to the Duchess of Portland and to other ladies, and his unfinished dictionary of botanical terms, reveal the author as a serious student of the science. Terms like "gymnosperm" and "petiole" came as easily to Rousseau's pen as to the pen of a Malesherbe or Jussieu. He practised the art of dissection—an example which many botanists of to-day, who are probably ready to sniff at Rousseau's scientific attainments, would do well to follow—and he owns to a "passionate attachment to the *Systema Naturæ* of Linnæus," which fact alone makes it impossible surely to account him anyone less than a botanist!

But this is not to say that Rousseau was a dry-as-dust. "Nothing is more singular," he wrote, "than the rapture, the ecstasy I felt at every observation I made on vegetable structure, and on the play of the sexual parts in fructification. The forks of the long stamina of the Self-heal . . . the explosion of the fruit of Balsam . . . and a hundred little acts of fructification filled me with delight, and I ran about asking people if they had ever seen the horns on the Self-heal, just as La Fontaine asked if Habbakuk had ever been read."

This could not have been written by Mr. Punch's stereotyped fossil with spectacles, straw hat, baggy trousers, vasculum, and butterfly net—he is a joyless soul, mainly concerned with "a preoccupied name" or a *nomen nudum.* I doubt, in fact, if it could have been written by anyone except J. J. Rousseau—the sentimental botanist.

Of a surety, J. J. could boast of no academic distinctions; he carried on no original research; he was a poor observer. He confesses that in botany he did not seek to instruct himself—it was too late for that. His idea was to pursue "a sweet and simple amusement" without any prodigious effort. All that he required was "une pointe et un loup." To him botany was "an idle study," a retreat from the delirium of imagination and the persecution of mankind. If botany, he declared, be studied from motives of ambition and vanity, only to become an author or professor, all the charm of it vanishes, and plants become the instruments of our passion.

In an amusing passage in the *Reveries*, he carefully weighs in the balance the respective attractions of the other sciences. The study of minerals, delightful as it is, meant costly experiments, furnaces, stifling vapours. Zoology also was a science full of difficulties and embarrassments to the virginal soul. How on earth was J. J. to observe, study, and dissect, to know the birds of the air, the fishes in the sea, and quadrupeds swifter than the wind—creatures "not more disposed to come and offer themselves for my research than I am to run after them and submit them to force." As he rightly observes, the study of animal life is nothing without dissection, and it would, therefore, be necessary for him —J. J. to wit!—to cut up animals and extract their entrails, "amid all the frightful apparatus, the corpses, livid flesh, skeletons, disgusting intestines, and pestilential vapours" of an anatomical theatre: "ce n'est pas là sur ma parole que J. J. ira chercher ses amusements."

A confessed dilettante then if you like, yet it is difficult to believe that Rousseau's influence, as that of many another amateur without hood or diploma, was not salutary and felt. He taught men to regard Nature and botanists to regard plants. Botany was not merely a question of dates and names and disquisitions sought after in the dusty parchments of Galen and Dioscorides. Rousseau cared for none of these things. Botanists must search, observe, and conjecture for themselves with the plant before them and the book on the shelf. He insisted on the divorce of botany from medicine, an alliance which hampered research in the pure science and reduced the study of vegetable life to the rank of handmaiden to the pharmacopœia. J. J. shared Montaigne's antipathy to physic and physicians, and the idea of his beloved plants being brayed in a mortar with a pestle and transformed into pills, plasters, and ointment revolted his romantic soul. Botany—that last stronghold of his imagination —must be jealously guarded against the calamity of defilement by association with such things as fever, stone, gout, epilepsy, and other ills of hateful, unhappy man.

The fancy likes to dwell upon the picture of those two bizarre misanthropes—Jean Jacques Rousseau and Bernardin de St.

Pierre—walking together into rural solitude and seeking there among the wild flowers what they could not find among their fellow men.

BIBLIOGRAPHICAL NOTES.

LXIII.—Lord Bute and John Miller.

The *Kew Bulletin* for 1892 contains (pp. 306–8) an interesting account—unsigned, but doubtless by Mr. W. B. Hemsley—of Lord Bute's *Tables*, the result of an inspection of the copy in the Royal Library at Windsor. The work itself, in spite of its rarity—only twelve* copies were printed for private distribution, at the cost, it is said, of £12,000—is fairly well known; Dryander's description (Cat. Bibl. Banks.) of the Banksian copy is, as usual, quite accurate. The Windsor copy contains a list of the recipients of the copies, and a similar list is in the copy now in the Department of Botany, which originally belonged to Mrs. Shute Barrington and contains the book-plate of her husband, sometime Bishop of Durham: this list, however, differs from that in the Windsor copy in the substitution of Lady Ruthven's name for that of Lady Weymouth. One of the copies of the work was sold at the sale of Mr. Laing's library in 1879 for £77 and another about the same time for about £50.† The title pages of the volumes bear no date, but Mr. Hemsley notes that the first volume of the Windsor copy is dated in MS. 1785—probably in Banks's hand. The work of course took a considerable time in preparation: we have in the Department of Botany a bill receipted by John Miller, the artist of the work, "in discharge in full of all deats," which gives a list of twelve drawings and twenty engraved plates delivered March 29th, 1782. It may be interesting to quote the cost of these:

	£	s.	d.
"The Engraving the Writing to 20 Plates .	1	3	4
Twenty Plates coppershid [*sic*] . .	1	8	4
Ten drawings	5	–	0
Engraving Twenty Plates	10	–	–
	£17	11	8"

Although Dryander's estimate of the *Tables*—"splendidi magis quam utilis"—may be accepted, students of classification should not fail to refer to the methods contained in the book and to the modifications or anticipations of these in the two works hereinafter described. An interesting passage may be quoted from the Introduction (p. 20), in which Bute, having described the "foundation" on which "the vegetable tables have been formed," continues:—

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* Mr. Hemsley quotes a memorandum pencilled in the Windsor copy to the effect that 16 copies were printed, but this is nowhere confirmed.

† Gard. Chron. 1879, ii, pp. 771, 776: the two notes may possibly relate to the same copy.

"The utility of something like this occurred to me early in life —and after many years' experience my opinion remains the same. Had the person employed by me, formerly, to execute this scheme, lived to give a new edition of his work, the many errors (unavoidable in so voluminous an undertaking) carefully corrected, might have answered every purpose—but his death left the whole design so imperfect, so altered from the original idea, that I discovered with difficulty the out-line of my plan. It became necessary therefore to review the whole subject—in doing which, I incline to think some considerable improvements have been made, both in the distribution and characters." The work referred to is the *Vegetable System* of John Hill (to 1775) which was undertaken at the suggestion of Bute. The reference to "the person employed" would seem to indicate that Bute also subsidized the work, but it would appear that such an undertaking, if entered into, was not carried out.*

The "thin volume of letterpress of 51 pages," entitled *Introduction to the General Tables of Plants, with a further explanation of the Tabular Arrangement*, of which Mr. Hemsley has seen the Windsor copy, may, as he suggests, have been issued with vol. i of the *Tables*—a suggestion based on the fact that Dryander catalogues it at the end of the volume. But as it appears neither in the Banksian, the Windsor nor in the Barrington copy of the volume this conclusion may be doubted, especially as it was the Banksian copy which Dryander catalogued. The copy in the Department of Botany is in a marbled-paper wrapper evidently contemporary with the text, which has neither title-page nor author's name. It was clearly the Introduction to a proposed larger work; this is indicated in the first sentence, and definitely asserted in the MS. note by Bute in the Windsor copy: "[the pages] are an Introduction to the General History of Vegetables, a very extensive Plan a great part of which is done, but there remains still too much for a man at the Extreme of Life to finish." Mr. Hemsley thinks this was written about 1785: Bute died in 1792.

Another small volume, of which I can find no trace in any catalogue, is entitled *A Tabular Distribution of British Plants*; this is dated 1780, and does not appear to have been published. It is a small quarto of 57 pages, of which pp. 3–23 are reprinted, with slight alterations and additions, in the introduction to the *Botanical Tables*. The classification, however, differs materially, both in arrangement and in definitions, from that printed in the published work. There is no indication of authorship, on the title-page nor elsewhere in the volume, which is lettered on the back "Lord Bute on Botany."

In connection with the *Tables* it may be interesting to give some fuller account than is given in the *Dictionary of National Biography* of a collection of drawings by John Miller which was acquired by the Department of Botany in 1880 from Messrs.

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* See *Makers of Botany* ("1913," *recte* 1912), p. 103.

Dulau & Co. for £5 15s. 6d. The drawings form five quarto volumes containing 928 leaves, each devoted to one plant, the whole being arranged alphabetically under the Latin names. There is a written title-page to each volume, as follows:

" DRAWINGS
of the
Leaves, Stalks, & Ramifications
of PLANTS,
for the purpose of ascertaining their several Species.
Executed
for the Right Honourable
THE EARL OF BUTE
in the Years 1783 and 1784.

By JOHN MILLER;
Author of the Illustration of the Sexual System of Linnæus."

The drawings, which are very carefully executed and coloured, are named in Miller's hand; each is signed by him and dated "83" or "84." Although executed for Bute, they were not utilized in the *Tables*, which contain only figures of flowers. The description on the title is entirely accurate, as no flowers are anywhere depicted. This evidently struck Thomas Hadley, into whose possession the volumes came, as a deficiency, and he has accordingly sometimes copied on the blank pages opposite Miller's figures (rather crudely) representations of the flower. I know nothing of Hadley; judging from his pencil note prefixed to the first volume, he was a careful man and interested in the collection: his note runs:—"In Donne's [*sic*] Catalogue there is a Reference to every Drawing in these five Volumes—another in my manuscript M. 23—also in my Manuscript Index M. 24 an index to all the Flowers which I have placed on the lefthand Pages." A list of these latter is prefixed to each volume. I do not find any reference to the drawings in any edition of Donn's catalogue which I have been able to consult, and we have no MSS. of Hadley. He added English names to the Latin ones placed by Miller at the head of each drawing, and sometimes placed at the foot references to *English Botany*, *Botanical Magazine* and *Botanical Register*, from which his own figures of the flowers were copied.

In the account of Miller in Dict. Nat. Biogr. no reference is made to Mr. Hemsley's papers in Gard. Chron. 1887, 451,* 1890, i, 255. In the latter of these a detailed account is given of Miller's principal work, the *Illustratio Systematis Sexualis*; another is given as an introduction to the German edition by F. G. Weiss (1789). The *Dictionary* makes no mention of the important work done by Miller in Philip Miller's *Figures of Plants*†

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* The date here given—1780—for Miller's death is incorrect: he was alive in 1789.

† A note may be added here as to the other artists engaged on this work. For the drawings the chief contributor apart from Miller was R. Lancake; plates 3–6, 38, 48, 57, 68, 82, 176, 177, 208, 215, 219, 220, 291 are by Ehret;

(1760), for which he engraved most of the plates (from 1755 to 1760), seventy-five of which he drew. The earlier of these are signed "J. S. Miller" but on and after t. 133 (1757) "J. Miller" is substituted. Miller also illustrated Hunter's edition of Evelyn's *Sylva* (1776) in which, as the preface states, he showed "great elegance and correctness as a draughtsman and engraver"; he also drew and engraved some of the plates in Stillingfleet's *Observations on Grasses* (1759).

Little seems to be known of John Miller's life in London. He was evidently on terms of intimacy with the botanists of his time: an autograph letter in the Department of Botany (1778) acquaints Dryander of the arrival of Dr. Rotherham from Upsal, with a letter from Linnæus; another, of the same year, invites Dryander and Thunberg to dinner "at two of the clock."

JAMES BRITTEN.

SHORT NOTES.

POTAMOGETON DRUCEI (p. 37).—At the date given by Mr. Marshall (*i. e.* in 1899) it is true that Mr. Fryer considered this "a valid species," but after careful watching of its growth his matured opinion was (June 9th, 1907) "*P. lucens* × *polygonifolius*"; Mr. Fryer first queried it as "*P. fluitans*" (1893). In his *Flora of Berks* Mr. Druce suggested "*P. natans* × *alpinus*"; in the Exch. Club Report for 1897, p. 568 (1898) he suggests "*P. alpinus* × *natans*, or *P. alpinus* × *polygonifolius*." Graebner (*Das Pflanzenreich*, IV, xi, 65 (1907)) makes it a species, placing it between *P. indicus* Roxb., and *P. polygonifolius* Pourr.; he remarks: "Eine sehr ähnliche Pflanze sammelte Nolte in Trave und Eider in Schleswig-Holstein"; and in a note says, "Planta *P. pulchro* americano valde similis sed folia submersa non crispata." To this I do not agree; my five series of Tuckerman's plant denies this similarity. He also notes that Mr. Druce had distributed it in Dörfler's *Herb. Norm.*, n. 4593. On p. 133 he gives it as "*P. alpinus* × *natans* ?" This hybrid is also given by Neuman, *Sveriges Flora*, p. 791 (1901), and by Kupffer, *Korresp. Nat. Ver. Riga*, xlix, 169 (1906), as found in "Oberflusse bei Age, 1805, Balt. Prov., Russia"; also by Fischer in *Ber. Bayer Bot. Ges.* xi, 61 (1907). Ascherson and Graebner in *Syn. Mitteleurop. Fl.*, ed. 2, i, 507 (1913) still call it "*P. natans* × *alpinus* ?." My own opinion concurs with Mr. Fryer's, as I could never get it to produce the colour of *P. alpinus* after repeated attempts. Still, it does produce apparently perfect fruit in cultivation occasionally, but neither Mr. Fryer or myself succeeded in growing it from the fruit.—A. BENNETT.

Nos. 44 and 182 by Houstoun. Plate 272 (*Helonias bullata*) is signed "J. Bartram"; the drawing is stated in the text to have been "made in the country where it naturally grows, by Mr. John Bartram junior"; probably William Bartram, whose draughtsmanship is well known, was intended. The principal engraver, apart from Miller, was T. Jeffereys or Jeffries, whose name appears on most of the plates up to 115; five (3–5, 44, 57) are signed by Mynde, The draughtsman of some of the earlier plates is not stated; thus 248–9, 51, though without name, are almost certainly by Miller.

CONVOLVULUS ARVENSIS (p. 37).—On a railway bank in Wimbledon there is a plant of this which regularly produces fully double flowers, with the corolla cut into segments nearly to the base, so that the flowers have the aspect of small pink "La France" roses. I first noticed the plant in 1914, and again in 1915; but last year it was unfortunately cut away in clearing the bank just after it had commenced flowering.—H. W. PUGSLEY.

MISTLETOE ON THE OAK IN SOMERSET.—The rarity of Mistletoe on an oak tree is sufficient to make it interesting that during this winter I have found an instance in Leigh Woods, close to Bristol. This is a new record for Somerset, and only ten such trees are believed to exist in England, distributed in six counties. The Avon gorge with its well-known suspension bridge is crowned on the Somerset side by a fringe of ancient woodland amongst which are many oaks, and one of these bears the parasite. The tree is the species *Quercus intermedia* Boenn., of moderate girth and about 50 ft. in height, probably more than a century old, as the soil is shallow over the limestone rocks. The mistletoe forms a large pendent bunch near the top.—IDA M. ROPER.

JUNCUS TENUIS IN CARNARVONSHIRE.—When on a visit to Capel Curig in the summer of 1914 I found this species in seven or eight distinct places along the Bangor road, extending from the Swallow Falls near Bettws-y-Coed almost to the highest point of the road near Tryfan, and again in one or two spots by the roadside towards Pen-y-gwryd. It is not easy to find among other *Junci* and long grasses, but it often betrays its presence by its habit of straying out into the road metal. It looks quite native, but of course any roadside plant may be introduced with road metal or by other means. The species is already recorded for the county in Griffith's *Flora of Anglesey and Carnarvonshire*, with a reference to Mr. J. Lloyd Williams's interesting paper on the plant in North Wales published in this Journal for 1896, p. 201.—A. H. WOLLEY-DOD.

PHLEUM ALPINUM IN ENGLAND.—The 80th Annual Report of the Bootham School Natural History Society (1914) says: "Far the best all-round naturalist is G. S. Adair, who exhibits a collection of 650 plants, of which 220 are new this year. His most interesting find is *Phleum alpinum*, from Helvellyn. This plant has not been previously recorded from any English locality, though Mr. G. C. Druce, of the Herbarium, Oxford, who has confirmed Adair's identification, points out that it has been previously found in the Grampians." Adair, who won a natural science scholarship at King's Coll. Camb., in Dec., 1914, contributed an interesting and thoughtful paper on "Plant Distribution in Teesdale" to the same Report, which is incorporated in *Bootham*, the magazine of this well-known school at York.—H. S. THOMPSON.

REVIEWS.

Report for 1914 of the Botanical Exchange Club. By the Editor and Distributor, R. H. CORSTORPHINE, B.Sc. Published by T. Buncle, Market Place, Arbroath, November, 1915. Price 3*s.* 6*d.*

IN accordance with our usual practice, we have selected from this Report certain passages which, for one reason or another, seem of general interest; but they by no means adequately represent its most notable features. To specialists the numerous remarks on particular genera, to which no further reference is made here, will be of special value; upon *Erophila*, *Viola*, *Sagina*, *Rubus*, *Rosa*, *Cratægus*, *Hieracium*, *Euphrasia*, *Mentha*, *Salix*, *Juncus*, *Potamogeton*, *Carex*, and others there are copious notes and opinions, the latter sometimes discrepant, for experts do not always agree. The notes are sometimes of considerable length—*e. g.* that upon an unnamed *Sagina* (pp. 130-132), collected near Arbroath by Mr. and Mrs. Corstorphine, upon which Dr. Moss, Messrs. Marshall, Salmon, Wheldon, Travis, C. E. Britton, and Druce express their opinions, the *consensus* being to regard it as a form of *maritima*. Occasionally they are a little puzzling—*e. g.* that on *Orchis prætermissa* Druce, itself perhaps not a very clearly defined plant; at any rate, the author of the species does not seem satisfied about the Essex examples on which the entry is based, but writes: "The middle lobe of the labellum is longer than in the type, and suggests the presence of *maculata*: I should like to see it in the fresh state."

Arabis alpina L. North side of the Cuchullins, Skye, June, 1910.—G. C. DRUCE and T. H. LEACH. This was from a different locality on the Cuchullins to that which was discovered by Mr. H. Hart in 1887, and is, I believe, the second time it has been gathered in the British Isles. Mr. Hart's specimens . . . are in fruit; ours, gathered in June, are in good flower. The plant is very local, and requires climbing to reach (2700–2800 ft. alt.), growing on damp rock ledges. . . . We did not see it on Scur Alister, where it is believed Mr. Hart originally found it.—G. C. DRUCE.

Arabis petræa Lam., var. *hispida* DC. Ben Hope, W. Sutherland, July, 1907. This hispid variety of *A. petræa* from Ben Hope differs from the plant of the Cairngorms and Snowdon in having much larger flowers, in this point resembling my var. *grandifolia* from Ben Laoigh; in fact, a few plants referable to that variety were found there. Mr. Arthur Bennett referred my *grandifolia* to *A. petræa*, var. *ambigua* Fries Mantissa iii, 77; the vague definition "elatior, foliis radicalibus lyrato-sinuatis caulinis subdentatis radice tenuiori" does not give the essential characters of the Ben Laoigh plant I designated var. *grandifolia*, which must stand for the Ben Laoigh plant. The var. *ambigua* Fries, *A. ambigua* DC. Syst. i, 231, is chiefly Siberian and Unalaskan and is not a perennial, and he makes no mention of size of leaves or flowers. —G. C. DRUCE.

Erophila præcox DC. Wigginton, Oxon, April 11th, 1914. The wall tops of this neighbourhood are covered with *Erophila*, a fair proportion of which is *E. præcox*. These elusive micro-species are all the more difficult to determine, in a great number of individual cases (some of the specimens now sent are only doubtfully *præcox*), because the colonies are by no means homogeneous, and there is much obvious transition between species, to say nothing of highly probable crossing. Another difficulty arises from the fact that pods vary in shape even on a single plant. The best and unmistakable *præcox* runs small.—H. J. Riddelsdell.

Silene nutans L., var. *dubia* (Herbich) Williams Mon. Silene in Journ. Linn. Soc. xxxii, 171 (1896). Shingle, Lydd, Kent, in great quantity, July, 1904. This appears to have been first described by Schur as *S. transsylvanica* in Oester. Bot. Zeit. viii (1858), pp. 22, 287. Herbich's *dubia* was published in his *Flora Bucowina*, p. 388 (1859). In the *Kew Index* both names are merged into *S. nutans*, but the publication of the latter wrongly cited as ex Rohrbach's *Monograph* of 1868, and the date as usual is suppressed. Dr. Williams in his valuable *Monograph* (*l.c.*) put *dubia* as a variety of *S. nutans*, and in the same year Rouy and Foucaud (Fl. Fr. iii, p. 144) cites *S. dubia* and *S. transsylvanica* as synonyms of their variety *subverticillaris*, the description of which does not seem to happily fit our Kentish plant, which Mr. C. E. Salmon in 1905 first clearly showed was distinct from *S. nutans*. The longer petioled and narrow, lanceolate-acute stem leaves, which are not so strongly viscid as in *S. nutans*, and the narrower and more cylindric calyx, are marks which he rightly emphasises. If kept as a species, it should stand as *S. transsylvanica* Schur. . . . A red flowered form was still earlier described as a species by Vest in *Flora* (1821), p. 50, as *S. rubens*. —G. C. Druce. "This is the more graceful, less hairy, flavescent-petalled plant I recorded as *S. dubia* Herb. in Journ. Bot., 1905, p. 127; where it is mentioned my brother and I saw it in this station (Dungeness) in 1888."—C. E. Salmon.

Cerastium tetrandrum Curt. Sandhills, Askham, v.-c. 69b, March 30th, 1914. Ironworks, sandhills, and golf links at Askham; limestone quarry at Staunton. Many plants are to be found flowering during the first week in March. Most of the flowers seem abnormally large through their being five-parted. The lower leaves are markedly spathulate and deeply tinged with reddish purple. Mr. Druce agrees with me that it is most likely *tetrandrum*, and adds the remark that in all probability much of what is named *pentandrum* is this plant.—D. Lumb.

Cerastium——? Hedgebanks, Rocklands, v.-c. 28, May 4th, 1914.—F. Robinson. "This seems to be a robust or shade-grown form of *C. arvense* L. It agrees with the description of the var. *latifolium* Fenzl in Ledeb. Fl. Ross. i, p. 412 (1842), which is as follows: 'Foliis caulinis majoribus, presaertim superioribus e basi late ovata oblongis v. lanceolatis; ramorum ac fasciculorum anguste lanceolatis v. linearibus; omnibus utrinque pubescentibus, cauliculis palmaribus spithamaeis et altioribus, petalorum lobis late ovatis.' There are specimens like this in the British Museum from one or two English localities, and also from the Continent."—A. B. Jackson. "This must be an *arvense* form, and it has the uppermost stem-leaves broad-based, one of the characters, according to Rouy and Foucaud (Fl. Fr.) of var. *latifolium* Fenzl, but I have no authentic examples to compare. I have never seen this beautiful luxuriant form in Surrey."—C. E. Salmon. "Ripe fruit is not available in these examples, but *C. arvense* L., var. *latifolium* Fenzl. (*C. grandiflorum* Gilib.) is like this, a tall form with broad leaves and large flowers, but I have seen no example."—J. A. Wheldon. "This is a rather notable form of *C. arvense* Linn., and appears to agree very well with the description of *C. arvense* L., var. *latifolium* Fenzl, in Rouy and Foucaud, Fl. de France iii, p. 203. The description given of this var. is as follows:—"Feuilles caulinaires, surtout les supérieures à base large, ovales-oblongues ou sub-lancéolées celles des fascicules et des rameaux étroitement lancéolées, toutes pubescentes ou poilues sur les deux pages; tiges assez élevées; petales à lobes ovales."—C. E. Britton. "An extraordinary plant, which I think comes under *C. arvense* L. It comes nearest, of the vars. given in Rouy and Foucaud, to their ϵ. *latifolium* Fenzl, but the stems, pedicels, and calyces are densely glandular." —E. S. Marshall.

Lotus tenuis Waldst & Kit. Rough pasture, clay washing on chalk, under "Eagle's Nest," Offley Hill, Hitchin, Herts, v.-c. 20, August 10th, 1914. *L. tenuis* in N. Herts occurs (1) on heavy boulder clay; (2) on the chalk scarp, in poor soil with a washing of marl or of clay from the caps on the hills. It generally occurs with *L. corniculatus*, and there appear to be intermediate forms. At Pagham, W. Sussex, v.-c. 13, it occurs on the sea bank in apparently drier situations, though perhaps moisture soaks up from below.—J. E. Little.

Senecio lautus Forst. Banks of Tweed, Selkirk, v.-c. 79, September, 1914. Native of Australia. Growing in this neighbourhood it does not increase by its own fruits, but by rooting all along its old wood. On a plant of two years' growth I counted 70 old stems, and the branches shooting from them each bearing on an average 190 blossoms.—I. M. Hayward.

Cnicus oleraceus L. Marshy meadow at Limehaugh, E. Perth, August 11th, 1914. This thistle appeared first in 1911 in a marshy meadow close by the River Tay, which in very high floods is liable to be inundated. It has appeared every summer since to the number of 60 or 70 flowering heads. As the meadow is cut about the end of August, it is doubtful if the plant produces ripe seed so as to give it the chance of becoming thoroughly naturalised. Although not a native of Britain it is common in Central Europe and in Scandinavia.—W. Barclay. . . . .

Chenopodium murale L. Trent Meadows, Nottingham, October 7th, 1914. This species was growing in fair abundance on waste ground adjacent to the site of the abortive Nottingham Exhibition of 1913. In the same field *Crocus nudiflorus* is abundant, and appears to be on the increase, owing to the erecting of palings for the above purpose around the station. With *C. murale* grew *C. opulifolium*, *C. olidum*, *C. rubrum*, *C. album*, vars., etc., and many interesting casuals, such as *Glaucium luteum*, an unexpected alien inland.—A. R. Horwood.

Juncus maritimus Lam., var. *atlanticus* mihi. Salt-marsh, St. Mary's, Scilly, September 5th, 1914. . . . . In my note on this plant (Journ. Bot. January, 1914, p. 19) I proposed for it the varietal name *atlanticus*, having concluded that the allied form *J. rigidus* Desv. (Rouy, Fl. de France), described as "*forte, rigide*," could not be identical. That description indeed seems to fit the type *maritimus* of this country rather than the variation under notice, which has a rather weak slender stem from four to five feet high. Still, as Dr. Moss has suggested, it will be well to compare this plant with specimens of *J. rigidus* in the Rouy Herbarium at Paris when an opportunity offers; and until that can be done the name *atlanticus* should be regarded as provisional. Examples in some degree approaching the Scillonian form have been lately forwarded from Poole Harbour, Dorset, by my friend Mrs. E. P. Sandwith. The following brief description may suffice to define this variety: Culmo subtenue, elato, ad 10—15 dcm. producto. Anthela magna ($2\frac{1}{2}$—4 dcm. longa) diffusa, abunde decomposita, *bracteam floralem inferiam multo superante*. Cætera ut typi. With reference to the comments of Professor Lindman and Mr. Adamson in the Report for 1913, p. 499, I would say that no botanist who had seen it growing in masses over a large area could possibly suppose this plant to be a monstrosity; and would ask how any state of luxuriance could so shorten the lower bract, not merely in relation to its own panicle, but in relation to that of a non-luxuriant type.—J. W. White.

[This note supplements and greatly amplifies the record in this Journal (*l.c.*), and we regret that it was not also sent to us for publication, in order that the Journal reference might have been complete.—Ed. Journ. Bot.]

Scirpus fluitans L. Near Yarnton, Oxon, June, 1914. Sent in order to put on record a curious instance of plant occurrence. *S. fluitans* is one of our rarest species, being only known from two localities, neither of which has recently yielded it. The place where I found it last year was well known to me in the eighties, as it was then a shallow piece of water, rich in Charas. Since 1900 the water level of one area has sunk, and vegetation—*Carex*, *Sparganium*, *Iris*, etc., have asserted themselves. In the dry period when I visited it there was but little water, but the surface of the wet ground was covered with masses of this *Scirpus*, which must have been brought, probably by aquatic birds, and finding a congenial home, with little competition, was thus enabled to make in a few years this remarkable increase.—G. C. Druce.

Carex Oederi Retz., var. *elatior* Anderson *Cyp. Scand.* 25, 1849. Wicken Fen, Cambridgeshire, July, 1904. L. H. Bailey's unfortunate attempt to displace *C. Oederi* Retz., and use it for a form of *C. flava* caused much confusion among British botanists, the effects of which have not yet ceased. The fact is *C. Oederi* has almost as close relation with *extensa* as it has with *flava*, and is a good species distinct from both. The more usual state is a very small plant especially fond of the gravelly margins of pools and lochs, but in our calcareous fen areas this robust plant occurs.—G. C. DRUCE.

Deyeuxia neglecta Kunth, var. *scotica*. Loch Watton, Caithness, July, 1907. This has more acuminate glumes and is the plant which was recorded as *strigosa* by Mr. Arthur Bennett in Journ. Bot. 1885, p. 253. I went to visit Dick's locality for the plant which was called *lapponica* in Smiles' *Life of Robert Dick*, and found only this form growing there. Afterwards I saw it near Loch Scarmclett. It really approaches *strigosa* in appearance, but does not agree with it in the length of the callus hairs, which are of the length of the floret in *strigosa*, which has also a broader and laxer panicle. *D. strigosa*, Prof. Hackel thinks, is probably a hybrid of *epigeios* and *neglecta*, and he is quite confident in rejecting these as *strigosa*. It is sufficiently distinct from normal *neglecta* to warrant a varietal name, var. *scotica*, characterised as "Panicles larger and more diffuse than type, glumes longer, and more longly acuminate."—G. C. DRUCE.

The Mycetozoa and Some Questions which they Suggest. By the Rt. Hon. Sir EDWARD FRY and AGNES FRY. 2nd edition. London: Simpkin Marshall. 8vo, pp. 99, 22 figs. 1*s*. net.

ABOUT ten years ago, the present writer, then beginning the study of Botany, had lent to him the first edition of this small book by a friend who has since writ his name large in the study of British plants. It is rare to encounter a popular work on any scientific subject that is worth reading, but this small book is an exception. A vivid description of the life-history of Myxomycetes is given—one of the most fascinating of life-cycles and at the same time one of the most puzzling to systematists. The questions suggested to the mind of one of the leading legal intellects of this country include some of the biological problems which have at times given all scientific workers material for thought. In such small compass it is not possible for the authors to develop matters very far, and in some cases different answers to the riddles have been, or could be given. For instance, "the fundamental character of the fact of species" is not impressed upon us by Falkenberg's experiments with *Culteria adspersa* and *C. multifida* when we remember that specific and even bigeneric hybrids exist in the plant kingdom.

The authors attempt to popularise the name "myxies": in one case at least such an expression as "endosporous myxie" is used, which seems somewhat like swallowing a morphological camel and refusing a systematic gnat. "Myxos" is the abbreviated form most commonly used: "creepies" is the name most often given by those who collect the species in the field; "slime mould" is an American innovation.

This second edition is substantially a reprint of the first, which was reviewed at some length in this Journal for 1900 (p. 55), and has long been out of print. The nomenclature has been altered in accordance with the second edition of the Lister monograph of the group. There are some misprints, and "the South Kensington Museum" is still referred to, although, as was then pointed out, "there is no such place."

J. R.

BOOK-NOTES, NEWS, &c.

We find we have omitted to call attention to the number (dated October 26th) of *The Journal of the Linnean Society* (Botany, xliii, 289) which is devoted to two papers of interest to British botanists. The first—"Ecological Notes; chiefly Cryptogamic"—is by the late William West, and embodies observations made in Scotland, Ireland, and Wales. The second is a study of "The Lichens of South Lancashire," by Messrs. J. A. Wheldon and W. G. Travis, whose contributions to our own pages are sufficient guarantee that the work has been thoroughly and exhaustively done. It deals with the adverse conditions affecting the Lichen-Flora, and its present state: a *resumé* of earlier published work follows, then a systematic list, very carefully done and including early records: the following novelties are described—*Bacidia latericola*, *B. arceutina* var. *brevispora*, *B. salicicola*, *B. epiphylla*, *B. muscorum* var. *atriseda*, *Microglœna nuda*. In the issue of the *Journal* (no. 290, dated Nov. 30) Mr. A. D. Cotton enumerates the Cryptogams collected in the Falkland Islands by Mrs. Elinor Vallentin in 1898–9: the *Melobesieæ* are undertaken by Madame Paul Lemoine. Several new species are described, two of which —*Endoderma maculans* and *Pteridium Bertrandii*—are figured.

At the meeting of the Linnean Society on January 20th, Mr. Miller Christy read a paper "On the definition of 'Right' and 'Left' in relation to coiled, rolled, revolving, and similar objects: a problem in scientific terminology," which was illustrated by specimens, models, and lantern-slides. He referred to such terms as "right" and "left," following or against the sun (in northern latitudes), "clock-wise" and "counter clock-wise," as used by biologists, and also cited terms used by mathematicians which could not be used by naturalists with any advantage. He advocated the usage postulated by Linnæus in his *Philosophia Botanica*, before he became confused and altered his definition to an absurdity and recommended the use of the heraldic terms "dextral" and "sinistral" as unambiguous terms.

At the same meeting Mr. Horace W. Monckton gave a communication on "Some Aspects of the Flora of the Bagshot District," illustrating it by specimens and lantern-slides of the scenery. He stated: This communication deals with the area occupied by the geological formation known as "the Main Mass of the Bagshot Sands." About half is in Surrey, the remainder being nearly equally divided between Berkshire and Hampshire. The more important places in the district are Wokingham, Ascot, Yately, Sandhurst, Bagshot, Chobham, Weybridge, Camberley, Winchfield, Farnborough, and Aldershot. The greater part was until recent times a tract of pine-woods, heaths, and peaty swamps, and its character was mainly due to the sandy nature of the Bagshot Formation and the gravels resting upon it. There is no lime in these strata and, though clay occurs in places, the soil is markedly different to that on the London Clay, which comes to the surface around the Bagshot district. The flora of much of the area resembles that of the Oak-Birch-Heath Association. Other parts fit in well with the Heath Association, though the author thinks that neither *Genista pilosa* nor *Juniperus communis* occur, and some species (such as the Broom, *Molinia*, *Galium saxatile*, *Senecio sylvaticus* and *Serratula tinctoria*) are perhaps more abundant than is indicated in the list given by Mr. Tansley. There are many tracts which may be described as partially reclaimed heath and on which we find *Polygala serpyllacea*, *Hypericum perforatum*, *Ulex nanus*, *Genista tinctoria*, *Epilobium angustifolium*, *Galium verum*, *G. erectum*, *Scabiosa Succisa*, *Solidago Virgaurea*, *Anthemis nobilis*, *Euphrasia brevipila*, *Luzula multiflora*, *Juncus squarrosus*, etc. Much of the high ground forms plateaux covered with gravel some 10 to 15 ft. thick, and on it we find the usual heath plants: considerable areas of *Vaccinium Myrtillus* with *Scilla nonscripta*, *Nepeta hederacea*, *Teucrium Scorodonia*, and in damp places rushes and *Polygonum Hydropiper*.

We have received a copy of the paper summarized above, which Mr. Monckton has printed for private distribution: his address is Whitecairn, Wellington College Station, Berks. It is nicely printed, and is remarkable for the prominence given to "English" names, with which nearly every flowering plant is supplied.

To the *Journal of Genetics* for December Miss Edith R. Saunders puts forward "a suggested explanation of abnormally high records of doubles quoted by growers of stocks (*Matthiola*)." The conclusion arrived at is that doubles on the whole develop more rapidly and vigorously than singles, and that where the period of development is sufficiently prolonged, selection based on this difference can be used as a means of securing a higher proportion of doubles to the beds than corresponds with the actual output of the parent plants.

The *Transactions of the Devonshire Association* for 1915 (pp. 160–170) contains the (seventh) report, edited by Mr. W. P. Hiern, of the Botany Committee. It includes records for each of the eight botanical districts into which the county has been divided, but contains nothing of other than local interest.

The last part of the *Journal of the Royal Horticultural Society* (xli, part 2) contains an interesting paper by Mr. George Forrest on "The Flora of North-western Yunnan," a region in which he has made so many interesting discoveries, notably in *Primula*, of which one range alone produced forty species: figures of some species, reproduced from photographs, accompany the paper. Mr. W. B. Mercer writes on "An Oidium Mildew on Carnations"; Mr. A. G. Jackman, whose father is commemorated in the popular *C.* × *Jackmanni* which he raised in 1858, on "The Clematis, its Development and Cultivation"; Dr. E. J. Russell contributes the first of a series on "Recent Plant Investigations on the Production of Plant Food in the Soil."

Says the *Westminster Gazette*: "Here were patches of purple heather—a rare plant in Ballymoyle—and ragged robin, and watercress, with its blue, forget-me-not flower"—a somewhat uncommon form to which we find no reference in the *Flora Hibernica*.

We have been asked for information regarding a victim of botanical zeal whose fate has been going the rounds of the papers: the following, from the *Observer* of January 30, throws some light on the matter:—

"From the *Observer* of 1816 (quoted in last week's *Observer*).

"A few days ago, as the Rev. Mr. Lawson, curate of Needham Market, was walking and leisurely botanising near the plantations of Barking Hall, he was caught in a man-trap, and though some persons were attracted to the spot by his cries, they were unable to release him, and he remained for nearly an hour and a half suffering the most excruciating pain before the gamekeeper could be found to unlock this cruel instrument of human vengeance. Mr. L.'s leg was much lacerated."

"From *Truth*, January 26, 1916.

"A few days ago a curate of Needham Market while on a botanical ramble near the plantations of Barking Hall was caught in a man-trap. His cries attracted some persons to the spot, but they were unable to release him, and he remained in the trap for an hour and a half until a gamekeeper came along, unlocked the trap, and set him free with a badly lacerated leg. I had thought that the use of these devices for dealing with poachers was extinct, but since that does not appear to be the case, the local police ought to take prompt action to bring to book those responsible for setting the trap."

We regret to announce the deaths of Sir Clements Robert Markham (January 30) and Canon Henry Nicholson Ellacombe (February 10), of whom some notice will appear in an early issue.

SOMERSET PLANT-NOTES FOR 1915.

By the Rev. E. S. Marshall, M.A., F.L.S.

A good deal of field-work was done, last season, both in the north and in the south of the county. The best addition was Mr. H. S. Thompson's *Carex lasiocarpa* (*filiformis*) × *riparia* = *C. evoluta* Hartm., from the peatmoor between Walton and Ashcott Station, dis. **8**, new for Britain, already announced in last year's *Journal* (p. 309). Vicecomital novelties are starred. Districts **1** to **4** and **6** belong to v.c. **5** S. Somerset; the rest are in v.c. **6** N. Somerset.

Ranunculus circinatus Sibth. **3**. Streamlet, near Staplegrove. *R. peltatus* Schrank, var. *penicillatus* (Hiern). **1**. Haddeo River, *W. Watson*. *R. homiophyllus* Ten. (*cœnosus* Guss.; *Lenormandi* F. Schultz). **2**. Horner; Ley Hill, *W. D. Miller*.

Helleborus viridis L. **3**. Cannington Park, *H. Slater*. *H. fœtidus* L. **9**. Hedgerow on the south side of Wavering Down, above Compton Bishop, *Dr. J. Wiglesworth;* believed to be native.

Berberis vulgaris L. **2**. "Fairly frequent in hedges: *e. g.* Luccombe; Porlock road, near the path to Horner; Timberscombe, &c." *A. H. Wolley-Dod*.

Fumaria Boræi Jord. **3**. In several places between Halse and Milverton, *H. S. Thompson*.

Sisymbrium Sophia L. **2**. Still occurs at Steart, *E. J. Hamlin*.

Erysimum cheiranthoides L. **3**. Cornfield, Feltham, *W. Watson*.

Lepidium heterophyllum Benth., var. *canescens* Gren. & Godr. (*L. Smithii* Hook.). **3**. Badger Street, *W. D. Miller*. *L. Draba* L. **5**. Established by a cart-track, below Dunball Station.

Thlaspi arvense L. **3**. Cothelstone, W. Watson. **5**. Dunball; near Kingweston.

Viola palustris L. **2**. Ley Hill, *W. D. Miller*. *V. odorata* L., var. *dumetorum* (Jord.) Rouy & Foucaud. **3**. By the Milverton Brook, near Croford Bridge. *V. lactea* Sm. **3**. Heath near Spring Grove, Milverton; also sparingly on Langford Heathfield. *V. contempta* Jord. **8**. This *arvensis* segregate (named by Dr. E. Drabble) is frequent in fields on Green's Combe Farm, above Milton Clevedon.

Polygala serpyllacea Weihe. **3**. Langford Heathfield; Bathealton.

Silene annulata* Thore? **3. Fields near Milverton, *Misses B. and M. Falcon!* Known to them for some years; last summer it was abundant among *Trifolium incarnatum*. I am not quite sure about this identification (having had no opportunity of seeing named specimens), but it appears to agree well with Rouy and Foucaud's description; they make *S. annulata* a variety of *S. cretica* L., distinguished by its almost globular capsule and shorter carpophore. Doubtless introduced with foreign clover-seed, but seems likely to persist; it had not previously been reported from Somerset.

Cerastium arvense L. 9. Above Axbridge, *H. S. Thompson.*

Arenaria serpyllifolia L., var. **viscidula* Roth (*glutinosa* Koch). 2. Scarce on pebbly beaches, west of Steart; *A. leptoclados* Guss., var. **viscidula* Rouy & Foucaud was much more plentiful. So far as I know, these two glandular forms are new for Somerset.

Montia fontana L. 4. Mount Fancy (Staple Fitzpaine), *W. D. Miller*, sp.

Hypericum Androsæmum L. 2. Horner Woods; Tivington; valley, west of Perriton, *Wolley-Dod.* Blue Anchor, *W. D. Miller.* Holford. *H. humifusum* L. 1. Exford, *W. Watson.* *H. elodes* L. 1. Tone Head, *W. D. Miller and W. Watson.* Pennycomb Water; Leigh, near Exton, W. Watson. 6. Bogs, near Churchstanton; locally plentiful.

Malva moschata L. 5. On the outskirts of Copley Wood, between Somerton and Kingweston, two forms with unusual foliage occur. The first has none of the leaves laciniate, and may be var. **integrifolia* Lej. & Court. (*Ramondiana* Gren. & Godr.); the second has finely cut upper leaves, and appears to be var. **heterophylla* Lej. & Court. Mr. Miller has found this species near Churchstanton (dis. 6).

Althæa officinalis L. 9. On the coast (beneath a cliff) between Portishead and Walton, *Rev. E. Ellman.*

Tilia cordata Miller. 9. Banwell, *Rev. E. Ellman.* Churchill Batch.

Geranium pyrenaicum Burm. fil. 9. Roadside, Brean, *E. J. Hamlin.* *G. pusillum* L. 3. Halse, *Miss Amy Smith*, sp. *G. Robertianum* L. 2. The coast plants formerly queried as var. *purpureum* (Vill.) are var. *rubricaule* Hornemann, according to Dr. Moss.

Erodium moschatum L'Hérit. 9. Rocky slope at the foot of the Cadbury range, near Tickenham, *Rev. E. Ellman and J. W. White.*

Genista anglica L. 3. Langford Heathfield, *W. D. Miller!* *G. tinctoria* L. 4. In numbers of rough pastures near Staple Fitzpaine, in great abundance, *W. D. Miller.*

[*Medicago sativa* L. 2. Minehead, W. D. Miller.]

Trifolium subterraneum L. 3. Cannington Park, *E. J. Hamlin.* *T. scabrum* L.; *T. striatum* L. 2. Blue Anchor, *W. D. Miller.* *T. fragiferum* L. 3, 5. On both banks of the Parret, Bridgwater, *H. S. Thompson.* *T. filiforme* L. 3. Langford Heathfield.

Lotus corniculatus L. 2. A small, very hairy specimen, from a quarry near Quantock Farm, Crowcombe (*H. S. Thompson*), agrees well with De Candolle's description of var. *villosus*, except that it lacks the upright habit—a point of minor importance. *L. tenuis* Waldst. & Kit. 8. Frequent in a clover-field on the south side of Creech Hill, near Bruton.

Vicia gracilis Lois. 5. Aller, 1867, *W. A. Hayne* in *Herb. Oxon.*; seen by H. S. Thompson. *V. bithynica* L. 2, Williton

Hill (seen for several years), *E. J. Hamlin.* **8**. Glastonbury Tor, *Herb. Oxon.* (*H. S. T.*).

Lathyrus Aphaca L. **5**. Aller, 1866, *W. A. Hayne* in *Herb. Oxon.* (*H. S. T.*). [*L. latifolius* L. **2**. A few plants, on shingly waste ground near the entrance to Minehead Warren; recent garden escapes or outcasts.] *L. montanus* Bernh. **2**. Combes above Horner, *W. D. Miller.*

Rubus idæus L. **6**. Churchstanton. *R. plicatus* Wh. & N. **6**. Moors near Churchstanton. *R. corylifolius* Sm. **4**. Staple Hill.

Potentilla argentea L. **9**. Several small patches, on a rocky slope at the foot of the Cadbury range, near Tickenham; looking like a native, but on limestone, *Rev. E. Ellman.*

Alchemilla minor Huds. **1**. Exford (probably this), *W. Watson.* **3**. Corfe, *R. Allan*, sp. **4**. Near Staple Fitzpaine, *W. D. Miller.*

Agrimonia odorata Miller. Court Hill, Clevedon, *Miss Ida M. Roper.*

Rosa micrantha Sm. **3**. Langford Heathfield. *R. arvensis* × *systyla.* **2**. Lane at Cowbridge, near Timberscombe, *Wolley-Dod*, sp. Very near *R. stylosa*, var. *pseudo-rusticana* Crépin (which Mr. Moyle Rogers has long believed to be this hybrid), but with longer peduncles than usual. "Aspect and odour of *R. arvensis.*" The petals are large, pure white, and remarkably thick.

Saxifraga granulata L. **10**. Railway bank near Keynsham, *Mrs. Sandwith* (*J. W. W.*).

Chrysosplenium alternifolium L. **8**. Milton Clevedon, by the River Alham, in small quantity.

Sedum rupestre L. **9**. Rocky slope at the foot of the Cadbury range, near Tickenham, *Rev. E. Ellman.*

Drosera rotundifolia L. **2**. Ascends to 1600 feet on Dunkery, *W. D. Miller.* **4**. Britty Common, above Staple Fitzpaine, *do.!* **6**. Bogs, near Churchstanton. *D. anglica* L. **4**. Britty Common, *W. D. Miller!*; associated with the last, and with **D. anglica* × *rotundifolia* (*obovata* Mert. & Koch), a hybrid not previously noted for Somerset. *D. longifolia* L. (*intermedia* Drev. & Hayne). **6**. Bogs, near Churchstanton.

Myriophyllum spicatum L. **6**. Pond on Widcombe Moor, *W. Watson.* *M. alterniflorum* DC. **1**. Pennycombe Water, *do.*

Callitriche truncata Guss. **3**. Cannington. *C. obtusangula* Le Gall. **4**. Puckington, *W. Watson.*

Epilobium angustifolium L. **1**. Near Raddington, *do.* On a large piece of open, stony ground in Copley Wood, near Kingweston (dis. **5**), there is a quantity of Willowherbs; I collected, among others, the following:—*E. tetragonum* 'L.,' Curt., var. **stenophyllum* Druce, and *E. Lamyi* F. Schultz (both plentiful); **E. Lamyi* × *obscurum*;* *E. Lamyi* × *parviflorum*; and **E. Lamyi* × *tetragonum* (the starred plants are new for Somerset, I believe). *E. roseum* Schreb. **8**. Milton Clevedon. **9**. Near Clevedon, *Rev. E. Ellman.* *E. palustre* L. **6**. Churchstanton.

Hydrocotyle vulgaris L. **3**. Common on the moors, about Wiveliscombe and Bathealton.

Œnanthe Lachenalii C. Gmel. 4. Roadside, near the top of Staple Hill, *H. S. Thompson.*

Caucalis nodosa Scop. 2. Blue Anchor, *W. D. Miller.*

Viburnum Opulus L. 3. Feltham, *W. Watson.*

Galium Cruciata Scop. 2. Cowbridge, near Timberscombe, *Wolley-Dod. G. uliginosum* L. 3. Langford Heathfield. *G. Vaillantii* DC. 8. Drove, south of Shapwick Station; also near Catcott Burtle, *H. S. Thompson.*

Asperula odorata L. 3. Wiveliscombe. 6. Blackwater, *W. D. Miller.*

Valeriana dioica L. 1. Exford and Withypool, *W. Watson.* 6. Churchstanton.

Erigeron acre L. 5. Hill-pastures on the Lias, near Kingweston.

Inula Helenium L. 2. Shurton and East Quantoxhead, *E. J. Hamlin.* 3. Upper part of Prior's Park Wood ("above Pitminster, but in Otterford parish," *W. D. M.*), *Judge W. B. Lindley.* 8. Near Walton, *H. S. Thompson.*

Achillea Ptarmica L. 2. Kilve, *E. J. Hamlin.*

Anthemis nobilis L. 3. Milverton (west of the railway station), *H. S. Thompson.*

Tanacetum vulgare L. 6. Buckland St. Mary, *W. D. Miller.*

[*Senecio squalidus* L. 9. Banwell; shore of Sand Bay, Kewstoke, and in one or two other places near Clevedon, *Rev. E. Ellman.*]

Arctium Lappa L. (*majus* Bernh.). 8. Roadside hedge, near West Pennard.

Carduus pycnocephalus L., var. *tenuiflorus* (Curt.). 2. Benhole, near Shurton Bars, *H. Slater.*

Cnicus pratensis Willd. 3. Langford Heathfield. 6. Plentiful on boggy heaths, etc., near Churchstanton.

Serratula tinctoria L. 5. Polden Hills, near the 7th milestone, *E. J. Hamlin* (probably in Shapwick parish, not far from Loxley Wood).

Hieracium maculatum Sm. 10. Wall at Stratton-on-the-Fosse, *Miss C. Bateman*, sp. *H. sciaphilum* Uechtritz, var. *transiens* Ley. 9. The Churchill Batch plant has glabrous-tipped ligules, and is clearly this variety; doubtless the other stations given in the *Bristol Flora* are also correct.

Taraxacum udum Jord. 3. Langford Heathfield; Broomfield.

[*Lactuca virosa* L. 5. Railway embankment, Somerton; a ballast alien, which seems likely to persist.] *L. muralis* Gaertn. 2. Luccombe, *Wolley-Dod.*

Legousia hybrida Delarbre. 8. Milton Clevedon.

Oxycoccus quadripetala Gilib. (*Vaccinium Oxycoccos* L.). 6. Trickey Warren, near Churchstanton, *W. Watson*, sp.

Erica cinerea L. 2. Near Triscombe Stone, with white flowers, *H. Slater.*

Lysimachia nemorum L. 1. Exford; Withypool, *W. Watson.* 6. Churchstanton.

Anagallis arvensis L., var. *carnea* (Schrank). 9. Near Clevedon, *Rev. E. Ellman*. *A. tenella* Murr. 6. Churchstanton.

Centunculus minimus L. 9. "Between Clevedon and Bristol" (probably near Tickenham), *Rev. E. Ellman*.

Blackstonia perfoliata Huds. 6. Churchstanton, *W. D. Miller*.

Erythræa pulchella Fr. 8. Highbridge, *H. S. Thompson*.

Menyanthes trifoliata L. 1. Leigh (Winsford Hill), *W. Watson*. 6. "In nearly every boggy bit of ground on the south side of the Blagdons." *W. D. Miller*. I saw a good deal of it on the moors near Churchstanton.

[*Nymphoides peltatum* O. Kuntze. 3. This was discovered, last year, in an old mill-lead at Cannington, by Mr. Slater; but it has since been cleared out. It was, I believe, either planted or an escape.]

Myosotis cespitosa Schultz. 3. Langford Heathfield. 6. Churchstanton. *M. repens* G. & D. Don. 2. Between Monksilver and Elworthy. 6. Churchstanton.

Echium vulgare L. 2. Blue Anchor, *W. D. Miller*.

Verbascum Blattaria L. 3. Milverton, *Rev. C. Q. Knowles*, sp.

Mimulus Langsdorffii Donn. 2. Timberscombe, *W. Watson*. *M. moschatus* Dougl. 6. Widcombe Moor, in or on the sides of streams, *do.*

Sibthorpia europæa L. 2. Between Monksilver and Elworthy. Selworthy Combe, *Wolley-Dod*.

Veronica officinalis L. 2. Horner, *W. D. Miller*. 3. Common around Milverton. 6. Churchstanton. *V. scutellata* L. 1. Pennycomb Water, *W. Watson*. 6. Churchstanton, *do.*

Euphrasia Rostkoviana Hayne. 2. Monksilver. 3. In several places near Milverton. 6. Churchstanton. *E. Kerneri* Wettst. 5. Hill-pastures on the Lias, near Kingweston. 8. Creech Hill, above Milton Clevedon and Lamyatt. *E. borealis* Towns. 9. Brean Down, *C. E. Salmon*.

Pedicularis palustris L. 6. Churchstanton. *P. sylvatica* L. 3. Langford Heathfield. 6. Churchstanton.

Rhinanthus major Ehrh. 8. Mrs. Sandwith and Rev. E. Ellman found this in two or three spots on the peatmoor, last August. I afterwards came across it, in profusion, near Edington Junction, and also a little to the south of Shapwick Station, but in smaller quantity; so it is probably frequent, in some seasons, and my opinion (based on observations in Scotland) that it is a native species, in such localities, received strong confirmation. It was not seen in cultivated ground. All the specimens examined belonged to the var. *platypterus* Fr.; they were glabrous, with broad seed-wings. This confirmation of the old records is most satisfactory,

Melampyrum pratense L. 4. Near Staple Fitzpaine, *W. D. Miller*.

Orobanche minor Sm. 3. Halse, *Miss Amy Smith*, sp.

Lathræa Squamaria L. 3. Near Milverton, *Miss B. Falcon*.

Pinguicula lusitanica L. **2.** Coldharbour (near Treborough), *W. D. Miller and W. Watson.* **4.** Britty Common. **6.** Moors, near Churchstanton.

Mentha piperita L. **4.** Staple Fitzpaine, *H. S. Thompson.*

Melissa officinalis L. **3.** Roadside near Kingston, in quantity; also (**4**) near Staple Fitzpaine, *H. S. Thompson.*

Salvia Verbenaca L. **2.** Kilve. **5.** Ashcott. [*S. verticillata* L. A casual at Walton, near Clevedon, *Rev. E. Ellman.*]

Nepeta Cataria L. **3.** Hedge on Cheddon Down, *W. D. Miller.*

Scutellaria minor Huds. **6.** Wet heaths, near Churchstanton. **8.** Near the east end of Glastonbury Moor (confirming Sole's record of 1782), *J. W. White.*

Marrubium vulgare L. **3.** Cannington Park Hill, on Mountain Limestone, *H. Slater*, sp.

Stachys officinalis Trevisan. **1.** Exford; Withypool, *W. Watson.*

S. arvensis L. **2.** Crowcombe, *H. S. Thompson.* **3.** West of Taunton, *do.* **8.** Milton Clevedon.

Galeopsis angustifolia Ehrh. **8.** Milton Clevedon. *G. Tetrahit* L., var. *nigricans* Brébisson. **8.** Near Edington Junction.

Lamium amplexicaule L. **8.** Milton Clevedon.

Chenopodium Bonus—Henricus L. **2.** Kilve. *E. J. Hamlin.*

Polygonum Bistorta L. **2.** Williton; Monksilver. **3.** Bathealton. Plentiful near Enmore, *E. J. Hamlin.* **4.** Staple Fitzpaine, *W. D. Miller.*

Rumex maritimus L. **3, 5.** Banks of the Parret, Bridgwater, *H. S. Thompson. R. limosus* Thuill. **8.** Near Edington Junction. Here it was associated with *R. maritimus*, in profusion, and *R. glomeratus* Schreb. (*conglomeratus* Murr.); but its full fertility, so unlike Dock hybrids in general, seems to make the theory that it is due to crossing between them very questionable.

Euphorbia platyphyllos L. **8.** Cornfield on Polden, near Cossington, *H. S. Thompson.*

Myrica Gale L. **6.** Moors near Churchstanton, *W. Watson! Salix repens* L. also occurs.

Empetrum nigrum L. **2.** "Evidently far from uncommon on the hills near Horner, other than Dunkery" (*e.g.* Ley Hill), *W. D. Miller;* he tells me that this is locally named "heathwhorts" (pronounced "hethurts") and supposed to be poisonous.

Spiranthes spiralis Koch. **4.** Puckington, *Rev. J. Hamlet*, sp.

Helleborine latifolia Druce. **4.** On the chalk, above Combe St. Nicholas, *W. D. Miller* (who thinks that it may be var. *media*).

Orchis incarnata L. **1.** Winsford Hill: Pennycomb Water, *W. Watson.* **6.** Wet heaths near Churchstanton; flowers varying from flesh-colour to purplish red. *O. latifolia* L. **2.** Monksilver. **3.** Bathealton; Elworthy. **6.** Churchstanton, *W. Watson. O. maculata* L. (*ericetorum* Linton). Common on moors about Churchstanton.

Ophrys apifera Huds. **3**. Milverton, *Miss B. Falcon*. **5**. Compton Dundon.

Habenaria conopsea Benth. **3**. Enmore, *E. J. Hamlin*. *H. bifolia* Br. **6**. Ringdown Common, etc., near Churchstanton, in wet bogs. *H. virescens* Druce. **4**. Frequent about Staple Fitzpaine, *W. D. Miller*. Puckington, *W. Watson*.

[*Iris tuberosa* L. **2**. Established sparingly, by a roadside, Stogumber.]

Narcissus biflorus Curt. Near Portbury, *Miss Lucas* (*J. W. W.*).

[*Leucojum æstivum* L. **3**. Outcast from a farmhouse garden, near Broomfield, *W. D. Miller !*]

Galanthus nivalis L. **8**. Apparently native, but scarce, by the River Alham, below Milton Clevedon, and in a narrow ravine called Foscombe Gully.

Polygonatum multiflorum All. **9**. A fine clump, in a thick hedge not far from Lower Farm, Charterhouse-on-Mendip, *H. S. Thompson*. **10**. College Wood, Downside, in plenty; associated with *Colchicum autumnale* L.

Narthecium Ossifragum Huds. **1**. Tone Head, *W. D. Miller and W. Watson*. **4**. Britty Common, *W. D. Miller !* **6**. Bogs on Ringdown Common, Churchstanton.

Juncus squarrosus L. **6**. Ringdown Common. *J. compressus* Jacq. **8**. Saltmarsh near Highbridge, towards Burnham; "considered typical by J. W. White," *H. S. Thompson*. **J. tenuis* Willd. **10**. Riverside path by the Avon, below Bristol, *Mrs. Sandwith*. Mr. White believes this to be a very recent introduction. *J. bulbosus* L. (*supinus* Moench). **3**. Langford Heathfield. **4**. Britty Common. **6**. Ringdown Common.

Luzula multiflora DC. **1**. Pennycomb Water, *W. Watson*. **2**. Selworthy, *W. D. Miller*.

Typha latifolia L. **6**. Widcombe Moor, *W. Watson*. T. *angustifolia* L. **5**. Near Weston Zoyland, *H. Slater*.

Sparganium neglectum Beeby. **3**. Cannington.

Potamogeton natans L. **6**. Pool on Widcombe Moor, *W. Watson*. *P. polygonifolius* Pourr. **1**. Tone Head, *W. D. Miller and W. Watson*. **4**. Mount Fancy and Britty Common !, *W. D. Miller*. **6**. Wet heaths, near Churchstanton. *P. crispus* L. **3**. Staplegrove. *P. pusillus* L. **6**. Pond on Widcombe Moor, *W. Watson ;* he believes it to be var. *tenuissimus* Koch.

Eleocharis multicaulis Sm. **1**. Pennycomb Water, *W. Watson*. **6**. Churchstanton moors.

Scirpus pauciflorus Lightf. **6**. A few plants, on Ringdown Common. *S. cæspitosus* L. **1** and **2**. Dunkery (up to 1600 feet), *W. D. Miller and W. Watson*. **6**. Ringdown Common. *S. setaceus* L. **2**. Crowcombe, *H. S. Thompson*, sp.

Eriophorum vaginatum L. **6**. Churchstanton moors; rather scarce. **E. gracile* Roth. **4**. In a very wet swamp on Britty Common, at nearly 900 feet. *E. latifolium* Hoppe grew near it. This is a welcome addition to our Somerset list, and a considerable westward extension of its known range (from Little Sea, near

Studland, Dorset). As the Devon border is not far off, it should also reach that county.

Rynchospora alba Vahl. **6.** Wet heaths, near Churchstanton.

Carex pulicaris L. **1.** Pennycomb Water, *W. Watson.* **2.** Combes above Horner, *W. D. Miller.* **6.** Churchstanton moors. *C. diandra* Schrank (*teretiuscula* Good). On the peat-moor, near Burtle, *H. S. Thompson*—only its second certain Somerset station. *C. paniculata* L. **4.** Britty Common. **6.** Otterford, *W. Watson.* Churchstanton. *C. echinata* Murr. **2.** Combes above Horner, *W. D. Miller.* **6.** Churchstanton moors. *C. remota* × *vulpina* (*axillaris* Good.). Near a pond on Widcombe Moor, *W. Watson.* *C. Goodenowii* Gay. **3.** Langford Heathfield. **4.** Britty Common. **6.** Churchstanton. *C. montana* L. **9.** "Abundant and widely spread [at Charterhouse-on-Mendip]. It covers scores of acres of rough pastures and open moorland, to my knowledge alone." *H. S. Thompson.* *C. pilulifera* L. **9.** Crook Peak, *do.*, sp. *C. panicea* L. **2.** Combes above Horner, *W. D. Miller.*—Var. *tumidula* Laestad. **6.** Bog on Ringdown Common. *C. pendula* Huds. **3.** Frequent by brooks, towards Charlinch and Durleigh, *W. D. Miller.* Bathealton. *C. helodes* Link (*lævigata* Sm.). **6.** Churchstanton. *C. binervis* Sm. **1.** Winsford Hill, at 1200 feet, *W. Watson.* **3.** Langford Heathfield; Milverton. **6.** Churchstanton moors. *C. fulva* Host. **3.** Langford Heathfield. **6.** Churchstanton moors. As usual, the sterile hybrid with *C. Œderi*, subsp. *œdocarpa*, occurred in both localities. *C. Œderi* Retz, var. *cyperoides* Marsson. **8.** This (as Mr. White has it), and not var. *elatior* And., is the plant growing on Shapwick Heath, which I had not seen there until last year. *C. hirta* L. **3.** Langford Heathfield. *C. inflata* Huds. (*rostrata* Stokes). **1.** Pennycomb Water (near Exford), *W. Watson.*

[*Panicum Crus-galli* L. **3.** A few plants, on the muddy bank of the River Tone, above Bathpool, West Monkton. The inflorescence is remarkably narrow, with erect branches; and I suspect that it may be the subspecies (or variety) *P. Hosti* Bieberstein.]

Agrostis setacea Curt. **4.** Staple Hill. **6.** Churchstanton. *A. canina* L. **6.** Churchstanton moors.

Calamagrostis epigeios Roth. **8.** By the canal, half a mile west of Shapwick Station, *H. S. Thompson.*

Holcus mollis L. **6.** Churchstanton.

Sieglingia decumbens Bernh. **3.** Langford Heathfield.

Molinia cœrulea Moench. **2.** Combes above Horner, *W. D. Miller.* **4.** Staple Hill. **6.** Churchstanton moors.

Melica uniflora Retz. **6.** Churchstanton.

Glyceria declinata Brébisson. **3.** Muddy borders of a small pond on Langford Heathfield.

Festuca arundinacea Schreb. **5.** "I appear to have this from the muddy banks of the River Parret, above Bridgwater, where it grows in abundance (name suggested by Mr. G. C. Druce)." *H. S. Thompson.*

Bromus erectus L. **5.** On the Lias, above Compton Dundon.

Nardus stricta L. **1.** Winsford Hill, *W. Watson.* **3.** Langford Heathfield.

Blechnum Spicant With. 6. Churchstanton.

Cystopteris fragilis Bernh,, var. *dentata* Hooker. 3. Wall, near Thurloxton, *H. Corder*, sp.

Lastræa spinulosa Presl. 6. Churchstanton, *Mrs. Macalister.*

Ophioglossum vulgatum L. 3. Broomfield, *Miss G. Sampson.*

Botrychium Lunaria Sw. 1. By the old mineral line on the top of the Brendon Hills, *Mrs. Parry.* 3. Aisholt Combe, *H. Corder.* 9. Barrow Hill, *Mrs. Sandwith* (*J. W. W.*).

Equisetum palustre L. 3. Bathealton.

Lycopodium Selago L. 3. Above Blagdon, *H. S. Thompson.* He writes that the specimen in *Herb. Clark* (1863) is not this, but *L. clavatum* 9. Blackdown, *Mrs. Sandwith.*

BATTARREA PHALLOIDES IN BRITAIN.

By J. Ramsbottom, M.A., F.L.S.

Miss E. F. Noel has presented to the National Herbarium a specimen of *Battarrea phalloides* found during October last in a hollow tree at Temple Guiting, Gloucestershire. The distribution of this rare fungus is so peculiar that the opportunity is here taken of recording its known appearances in this country. According to C. G. Lloyd (*Tylostomeæ*, 1906, p. 6), the typical form occurs in England, France, Australia, and California. It is known from only one locality in France, near Moulins (Allier); Lloyd gives a note by E. Olivier on its occurrence: "C'est le 22 septembre 1892 que pour la première fois j'ai trouvé le *Battarrea phalloides* croissant sur le sol dans l'intérieur d'un chêne creux sur une couche épaisse de débris d'écorces et de feuilles décomposées. Quelques jours après, j'en ai retrouvé deux individus dans les mêmes conditions dans l'intérieur d'un autre chêne distant du premier d'environ 500 mètres . . . Depuis cette époque, chaque année, j'ai vu le *Battarrea* au nombres de plusieurs exemplaires surtout dans l'intérieur du premier chêne."

The fungus was first described and figured by Thomas Woodward in Phil. Trans. lxxiv, p. 423 (1784)—"An account of a new Plant of the Order of Fungi. This extraordinary vegetable production arises from a volva, which is buried six or eight inches deep in dry sandy banks; and, consequently, it is extremely difficult to detect in its earliest state." According to Woodward, Mr. Humphreys,* of Norwich, first found the fungus, but in a far advanced condition, when it was taken by some persons for a decayed or abortive agaric. Woodward himself first met with the fungus in its dry and withered state near Bungay, Suffolk, in the spring of 1783, and sent it to

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* Smith (Spicil. fasc. i, 11) writes his name "Humphrey" and styles him "senex optimus mihique olim familiarissimus"; in Trans. Linn. Soc. vii, 297 he speaks of "Humfery" as "an amiable and communicative man."

James Dickson, who requested him to watch the spot and endeavour to detect the plant in its earliest appearance. Woodward, together with his neighbour, " Mr. Stone, a most diligent and skilful botanist, who first restored the *Lycoperdon coliforme*," examined the spot carefully, and about the middle of August found the plant just arisen—" but though we have daily visited the spot since, we have never been able to find it again in so young a state; for so rapid appears to be its growth, that we have found plants of two or three inches height above the ground, the stems of which had lost part of their mucilage, where the day before none had been visible." Woodward queries whether the fungus is not a new genus. " This plant agrees with the genus *Phallus* in its volva, which has a double coat replete with mucilage; and its stipes crowned with a reflexed pileus. But it more nearly approaches the genus *Lycoperdon*, by its head covered with a thick dust, contained in a substance of a spongy appearance, and by the form of the dust, which agrees perfectly with that of most of the true lycoperdons, when examined in the microscope. To this genus it must at present probably be referred, though the total want of an exterior coat prevents its agreeing with it so perfectly as it ought." Later accounts of the fungus do not give so much prominence to the presence of mucilage even if they mention it.

Dickson (Plant. Crypt. Brit. Fasc. i, p. 24 (1785)) gives the name *Lycoperdon Phalloides* to the plant. J. E. Smith (*Spicilegium Botanicum*, 1792, p. 11) redescribes it apparently from Woodward's specimens, and gives a coloured plate by J. Sowerby. An almost identical figure is given in Sowerby's *English Fungi*, t. 390, in the letterpress to which we are told that " Mr. Davey, of the Grove, Yoxford, finds it annually in Suffolk." Persoon in 1801 (*Synopsis*, p. 129) proposed a new genus *Batarrea** for the reception of the fungus. M. J. Berkeley in Smith's *English Flora*, v, p. 299 (1836) gives the habitat as " on sand hills " and an additional record:—Stoke, Norfolk, W. J. Hooker.

The next record of the fungus in this country is in a paper by H. H. Higgins (Proc. Lit. Phil. Soc. Liverpool xiii, p. 131 (1859)) —" in bare sand on the broken bank of a hedge, near the top of the hill, Claremont, New Brighton, November 12th, 1857." In 1872 W. G. Smith exhibited four specimens at the Linnean Society meeting: these had been found at Nork, near Epsom (see Journ. Bot. xi, p. 121 (1873)). There is a specimen in the Kew Herbarium from C. H. Spencer Perceval, of the same locality and date, and a drawing by Mrs. Russell in the plate collection of the Natural History Museum—" in hollow ash, Nork, near Epsom, December 1872. C. H. Sp. Perceval." This appears to be the last record until Miss Noel's Gloucestershire find.

In the plate collection at the National Herbarium there is also a very poor drawing of *Battarrea* but without date or locality, and

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* "Memorabilem hunc fungum, ut peculiare genus, in memoriam beat. Battarræ, ob suam *Fungorum agri Ariminensis historiam* de Re botanica bene merentis, denominavi." The author mentioned wrote his name as Battarra.

Sowerby's original drawing. In the Kew Herbarium there is a specimen from Sowerby's Herbarium, two specimens from Mr. Frost, Dropmore, and three specimens from Dawson Turner, Norfolk.

Thus *Battarrea phalloides* has been recorded from :—Norfolk (Norwich, Stoke), Suffolk (Bungay, Yoxford), Cheshire (New Brighton), Surrey (Nork), Bucks (Dropmore), and Gloucester (Temple Guiting).

THE TERMS HOMOZYGOUS AND HETEROZYGOUS.

By A. J. Wilmott, B.A., F.L.S.

These terms, referred to by the Rev. E. S. Marshall (Journ. Bot. 1916, p. 10), were introduced into the science of genetics by Prof. Bateson when the rediscovery of Mendel's papers in 1900 led to the sudden new developments in experimental Heredity. Hedlund has latinised them ("homozygotica" and "heterozygotica") and apparently uses them as synonymous with "breeding true" and "not breeding true." In some cases he has experimental data as foundations for his use of the terms, but in other cases he uses them putatively. Anyone who wishes to follow modern developments in taxonomic thought must now become acquainted with the main principles of modern work on Heredity and Variation in general, and in particular with the branch of Heredity usually called "Mendelism." In the light of modern work we now know that many former systematic ideas have no foundation in fact. For instance, hybrids are not necessarily intermediate in characters between their parents. Should all the characters of one parent be dominant, and all those of the other recessive, the hybrid will to the eye be quite indistinguishable from the parent with dominant characters, as has actually happened. It is also known experimentally that in general reciprocal crosses are identical, and at any rate that it is impossible to distinguish the male parent by inspection of the hybrid. But although the number of fallacies that are dead increases steadily, the ghosts of most of them may still be seen roaming about systematic literature.

Hedlund's use of the terms is only partially correct, for they only apply to each individual character under consideration. Such characteristics as tallness or shortness, simple or branched stems, hairiness or glabrosity, glandulosity or eglandulosity, acuteness or obtuseness of the pods of *Pisum*, keeled or rounded glumes in wheat, leaf-serration in *Urtica pilulifera* × *U. Dodartii*, very many characters in *Capsella*, the annual or biennial habit, and other structural characters to say nothing of innumerable colour forms, have been shown to follow the laws of Mendelian inheritance; and it is not impossible that even the so-called continuous variation, excluding that small part of it which is definitely known (not imagined) to be due to environment, really follows the same laws. But in general, each factor of the fertilised egg's constitution which controls the development of the mature individual's visible characters, is quite independent of all the others. Plants must therefore be said to be homo- or hetero-zygous *in respect of each factor* separately, for they are rarely, if ever, capable of being called homozygous *plants.* Individuals (and the races or species they compose) in any species where self-fertilisation is not absolute are almost certain to be heterozygous in respect of some characters, which the working systematist usually then states to be "of no importance" or "not good characters." Continuous self-pollination following on a single chance cross-pollination inevitably leads by the mathematical laws of chance to the gradual appearance of increasingly *homozygous* true breeding *strains* with every possible combination of characters. Hence, doubtless, the "races" of *Senecio vulgaris*, of *Erophila verna*, and so on.

Those who wish to become conversant with the principles involved cannot do better than obtain Doncaster's *Heredity in the Light of Recent Research*, one of the Cambridge (shilling) Manuals of Science and Literature. More advanced works are R. C. Punnett's *Mendelism*, R. H. Lock's *Variation, Heredity and Evolution*, and W. Bateson's *Mendelian Principles of Heredity.*

NOTE ON PUCCINELLIA *Parl.*

By the Editor.

In *Rhodora*, xviii, 1–23 (Jan. 1916) appears a paper on "The Genus *Puccinellia* in Eastern North America," by M. L. Fernald and C. A. Weatherby, which is of interest to British botanists, as it proposes and apparently justifies the adoption of a generic name which has not, I think, hitherto been taken up in British books. The genus in Eastern North America includes ten species, of which three are British—*P. maritima* Parl. (Fl. Ital. i, 370), *P. distans* Parl. (*op. cit.* 367), and *P. rupestris* Fernald & Weatherby, comb. nov. On this last the authors, having cited the synonymy of the species—"*Poa rupestris* With. Arr. Brit. Pl. ed. 3, ii. 146, t. 26 (1796). *Poa procumbens* Curtis, Fl. Lond., fasc. vi. t. 11 (Exact date of publication not known but probably later than Withering's species. See note below). *Sclerochloa procumbens* Beauv. Agrost. 98 (1812). *S. rupestris* Britten & Rendle, Journ. Bot. xlv. 107 (1907). *Glyceria procumbens* Sm. Engl. Fl. i. 119 (1824). *Festuca procumbens* Kunth, Gram. i. 129 (1829). *Atropis procumbens* Thurb. Bot. Cal. ii. 309 (1880)"—have an interesting note:—"Britten & Rendle give excellent reasons for concluding that *Poa rupestris* With. was published earlier than *P. procumbens* Curtis:—see Journ. Bot. xlv. 107 (1907). In addition to their reasoning it may be noted that Withering, in his original description (ed. 3) states merely that the plant was

'Gathered on St. Vincent's Rocks, near Bristol, by Mr. Milne, who observed to me that Mr. Curtis first found it there.' In his 4th edition, ii. 147 (1801) he adds, 'Sir Thomas Frankland found this plant growing on the waste ground near the Dock, betwixt Bristol and the Hotwells. Also on the new Pier at Scarborough.' This additional information is given in Curtis's publication and presumably taken from it by Withering (though he makes no acknowledgement) and the natural inference is that Curtis's species was published after Withering's 3rd edition and before the 4th. Also, Withering cites 'Curt.' in edition 4, not in edition 3." This point had escaped us when we drew up the *List of British Seed-plants*, in which we retained the genus *Sclerochloa*. Another British species included by Parlatore in *Puccinellia* is *P. festucæformis* (p. 368); if the genus be accepted by British botanists, our other species of *Sclerochloa* will have to be transferred to it, but I purposely refrain from making new combinations.

The following is the introductory portion of Messrs. Fernald & Weatherby's paper, in which the history of *Puccinellia* is given:

"The essentially halophytic genus *Puccinellia* of Parlatore (Fl. Ital. i. 366, 1848) has always been one of the least understood and, even to agrostologists, one of the most perplexing groups of grasses. The species superficially so closely simulate one another that by many experienced botanists they are merged; while the generic status of the plants is often questioned. Thus by some European botanists (for instance, Druce and Ostenfeld) the plants are included under *Glyceria*, by others (as Ascherson & Graebner) treated as a section of *Festuca*, while Britten & Rendle include them in *Sclerochloa*. In some characters species of *Puccinellia* certainly approach all three of these genera, yet as a whole the plants seem to constitute a good genus for which *Puccinellia* is the earliest unequivocal name.

"In Europe, however, the name *Puccinellia* is not generally in use; but those who treat the group as a genus (for instance, Briquet, Richter or Rouy) call it *Atropis*. The status of *Atropis* as a generic name is, nevertheless, open to serious doubt. It is commonly cited as dating from Trinius in Ruprecht's *Flores Samojedorum Cisuralensium* (Beitr. zur Pflanzenk. des Russischen Reiches, ii. 61, 64, 1845), and Grisebach in Ledebour's *Flora Rossica*, but in the enumeration of plants Ruprecht included it, as Trinius (Gram. Suppl. 68, 1836) had previously done, under *Poa*, indicating *Atropis* (Rupr. *l. c.* 61) as well as *Phippsia, Catabrosa, Arctophila* and *Dupontia* as sections or subgenera, thus;

"'311. Poa (Phippsia) algida (R. Br.).'
"'312. Poa (Catabrosa) airoides Koel.'
"'313. Poa (Atropis) distans L.'
"'314. Poa arctica R. Br.'
"'315. Poa alpina L.'
"'316. Poa pratensis L.'
"'317. Poa (Arctophila) deflexa*.'
"'325. Poa (Dupontia!) psilosantha*.'

"On a succeeding page, in a note under *Poa (Dupontia) pelligera*, Ruprecht made the observation that these various sections differed from one another in certain characters: 'Atropis Trin. (P. distans) Catabrosae quoad glumas proxima, spiculas habet (saltem in statu virgineo) lineares, fere teretes' (Rupr. *l.c.* 64); and 'From the condition of the glumes perhaps a series of genera as follows: Dupontia, Arctophila, Poa, Atropis, Catabrosa, Phippsia, Coleanthus.' The enumeration of these plants as species of *Poa*, *Poa (Atropis) distans*, etc., by Ruprecht (or Trinius through Ruprecht) and then the giving on a subsequent page of brief, inadequate characterisations with the suggestion that these sections of *Poa* are 'perhaps' genera, does not, it seems to us, clearly establish *Atropis* and others so treated as well published genera dating from 1845. And it is noteworthy that most authors who take up *Atropis* cite not only the Ruprecht reference but the later reference to Grisebach in Ledebour (Fl. Ross. iv. 388, 1853) as validating the genus. Grisebach, in Ledebour, certainly gave a clear generic characterisation and treated the species unequivocally as species of *Atropis*, so that *Atropis* as a well published genus should date from Grisebach's treatment in 1853. In 1848, however, Parlatore, with equal clarity and completeness had characterised *Puccinellia* as a genus to include some of the species, *P. distans* and *P. maritima*, later placed by Grisebach under *Atropis*: and it seems to us that the cause of sound nomenclature is best served by maintaining the fully and definitely published *Puccinellia* Parlatore (1848) rather than the inadequately and uncertainly published *Atropis* Trinius in Ruprecht (1845, validated by Grisebach in 1853)."

The date—1848—assigned to the volume of the *Flora Italiana* is that which appears on its titlepage, but Italian titlepages are not always conclusive evidence: in periodicals they are sometimes issued with the first number for the year. It would be worth while to ascertain whether the *Flora* was issued in parts: the printed *wrapper* of vol. i bears date 1850: the volume contains 568 pages—*Puccinellia* comes about the middle (pp. 366–371).

REAUMURIA ALTERNIFOLIA *comb. nov.*

By James Britten, F.L.S.

We have in the National Herbarium an authentic specimen of *Hypericum alternifolium* La Bill., endorsed by Dryander "Syria. J. J. La Billardière, M.D.," and written up by him with its name and place of publication. It was published by La Billardière in his *Icones Plantarum Syriæ Rariores*, decas ii. (1791), where the plant is figured and fully described (t. 10, p. 17). Willdenow (Sp. Pl. ii, 1250, 1799) transferred it to *Reaumuria* as *R. hypericoides*; and the name was adopted by Poiret (Encycl. vi. 87, 1804) and Persoon (Syn. ii. 85, 1807); La Billardière's plant being in each case the only one referred to.

In 1809 Willdenow (Hort. Berol. 578) extended his view of *R. hypericoides* by including in it as a synonym *R. cistoides* Adam (in Web. & Mohr, Beitr. i. 61, 1805); and from that period it is the latter plant which, according to Jaubert and Spach, the monographers of the genus (who retain it as a distinct species), has represented *R. hypericoides* in subsequent literature and in herbaria. It is this that is figured as *hypericoides* by J. F. Jacquin (*Eclogæ* i, 92, t. 627, 1815), who includes *cistoides* as a synonym, and by Salisbury (Parad. t. 18, 1805) as *R. linifolia*—a name which he substituted for *hypericoides*, which he considered inappropriate.

The interest attaching to La Billardière's plant is increased by the fact that Jaubert and Spach (Ann. Sc. Nat. 3s. viii. 381; Ill. Pl. Or. iii. 55)[*] took this, of which they had seen an authentic specimen, as the type of a new species, *R. Billardieri*, which has been retained as distinct by later authors—*e.g.* Boissier (Fl. Orient. i. 762), who had also seen La Billardière's plant and Niedenzu (Pflanzenfam. iii. 6, 293), who follows Jaubert and Spach in placing it with *R. squarrosa* in a separate sub-section. The name *hypericoides* was altogether abandoned by these authors, who as has been said adopt for the plant which had been generally so called *R. cistoides* Adam—a name which, in view of the supersession of Willdenow's original *hypericoides* by La Billardière's earlier trivial, will apparently have to stand.

The following sums up the synonymy of the two plants:

REAUMURIA ALTERNIFOLIA (La Bill.) comb. nov.
    Hypericum alternifolium La Bill. *Ic. Pl. Syr.* dec. ii. 17, t. 10 (1791).
    Reaumuria hypericoides Willd. *Sp. Pl.* ii. 1250 (1799); Poiret *Encycl.* vi, 87 (1804); Pers. *Syn.* ii. 85 (1807); Willd. *Hort. Berol.* 578 (1809) ex parte.
    R. Billardieri Jaub. & Sp. in *Ann. Sc. Nat.* Sér. 3, viii, 381; *Ill. Pl. Or.* iii. 55; Boiss. *Fl. Or.* i. 762 (1867).
REAUMURIA CISTOIDES Adam in Web. & Mohr *Beitr. zur Naturkunde*, i. 61 (1805); Jaub. & Sp. *ll. cc.* 380, 55, cum syn.
    R. hypericoides Willd. l. c. ex parte; J. F. Jacq. *Eclog.* i. 92, t. 62 (1815); Boiss. *l. c.* 761; et auct. plur., non Willd. *Sp. Pl.* (1799).
    R. linifolia Salisb. *Parad.* t. 18 (1805).

ANDROSACE CILIATA IN THE ALPS.

By H. Stuart Thompson, F.L.S.

SEVERAL small specimens of an *Androsace* from the Grands Mulets (10,000 ft.), on Mont Blanc, which in 1903 I had carelessly named *A. glacialis*, prove to be *A. ciliata* D.C. (*Aretia ciliata* Lois.), a rare and characteristic species hitherto recorded only from the French and Spanish Central Pyrenees. This extension in range from the Franco-Spanish to near the Franco-Swiss frontier is very interesting. Mr. Cedric Bucknall, whose critical knowledge of European plants is equalled by few persons in this country, confirms my determination.

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[*] I do not know which of these was first published: the volume of the *Annales* is dated 1847, that of Ill. Pl. Or. 1847–50: the Kew Index cites the latter. The text of both is identical.

My Mont Blanc specimens are similar in all essential details to more mature ones in my herbarium gathered in Hautes Pyrénées by Bordère, August, 1864. The yellowish-green colour of the foliage of both gatherings is a feature, at least in dried specimens, which I do not find mentioned in books. The leaves are oblong-spathulate, usually glabrous but strongly ciliate at the borders, neither persistent nor in columns, as in several allied species, but in spreading rosettes. The solitary pink or mauve flowers with yellow throat are on strong peduncles averaging 10 mm. in length and slightly exceeding the leaves. The calyx-segments are lanceolate-acute, hispid, and spreading at maturity.

The Grands Mulets are the isolated, dark rocks, surrounded by ice and snow, so readily seen in views of Mont Blanc from Chamonix and district, and they are just 10,000 ft. above sea level. Although small in area, and the site of a well-known alpine hut, I need have no hesitation in naming them here, because, apart from the rise of 6600 ft. from Chamonix to the rocks, in the ascent of Mont Blanc the more dangerous and interesting part of the climb usually, except in bad weather, lies among the crevasses at a lower elevation. In other words, it is more than a mere promenade to the Grands Mulets. On July 18th, 1903, the crevasses were in an exceptionally bad state, owing to fresh snow, so that my guide insisted on an early return. Possibly for that reason I gathered no other flowering plants on the Grands Mulets except *Saxifraga bryoides*, *Erigeron alpinum* and *Chrysanthemum alpinum* (see my *Notes* in *Climbers' Club Journal*, December, 1906).

Rouy gives as the habitat of *Androsace ciliata* "débris mouvants à la dernière limite de la vegetation"; and for distribution he mentions "Montagnes de Gavarnie, sommet du pic du Midi, port de la Canau, lac et port d'Oo, mont Perdu, Maladetta, sommet du pic Néthou." The Néthou is the highest summit of the Pyrenees (11,165 ft.). The top is a plateau 75 ft. by 25 ft., surrounded by precipices except on the N. side.

SHORT NOTES.

Surrey Plants.—In this Journal for 1910 (p. 186) mention was made of a number of halophilous plants that flourish by the Thames above Putney. This permanent colony now includes *Aster Tripolium*, *Glaux Juncus Gerardi*, *Triglochin maritimum*, *Scirpus maritimus*, *S. carinatus*, *S. triqueter*, *Carex divisa*, *Agropyron pungens*. On the tow-path, near at hand, grow a number of poplar trees that Mr. A. Bruce Jackson and I agree to be similar in leaf characters to the tree that has been named *Populus deltoidea* × *nigra* var. *betulifolia.* The true glabrous *P. nigra* grows on Putney Heath, probably planted: elsewhere, as about Horsley and Ockham, I have only seen the var. *betulifolia. Agrimonia Eupatoria* var. *sepium* grows in a thicket near Wimbledon Common. On Littleworth Common is a form of *Sagina procumbens* strikingly unlike the usual form, as the flowers are mostly pentamerous and the petals are quite half as long as the sepals. *Galium erectum* × *verum*, near Leatherhead. *Centaurea pratensis* Thuill: I refer to this, after comparing them with continental specimens, plants gathered in several Surrey localities, Chelsham, Leatherhead, New Malden, etc. Within the past two years, *Azolla filiculoides* has become established on a pond at Lower Morden.—C. E. BRITTON.

NEW BRITISH GALLS (p. 27).—Mr. E. W. Swanton mentions four species of Willows on which "witches' brooms" occur, but they may be seen on two other species in Kew Gardens at present, namely *Salix pentandra* and *S. babylonica* var. *annularis.* These galls have been familiar and conspicuous objects on Willows on Hampstead Heath for some four years now, and *S. babylonica* seems to become more and more infested each season.—H. BOYD WATT.

DID DOODY OBSERVE THE OOGONIA OF FUCUS?—Tancred Robinson writes to Ray, under date August 24th, 1686 (*Correspondence of Ray*, ed. Lankester, p. 187)—"The other day I and Mr. Doody (an apothecary here) had occasion to go five or six hours down the river . . . near Gravesend. We observed in the long broad vesicles at the end of the leaves of the *Fucus maritimus latifolius vulgatissimus* [*Fucus vesiculosus*], many small dark round bodies adhering to the inner membranes, which contained a mucous liquor: whereas the round bladders in the other parts of the leaves were void of liquor, and of those dark solid globules, which gave Mr. Doody and myself reason to fancy that this plant abounds with seed, which upon drying, disappears." It may be remembered that at this period Hooke and Grew had made the use of the compound microscope familiar to Fellows of the Royal Society, even if Doody and Robinson could not have detected the oogonia or antheridia of *Fucus* with the naked eye. After this observation—as in the Dillenian *Synopsis* (1724), p. 41—the extremities of the fronds are termed "summitates seminiferæ" and the swollen portions, "tuberculi seminales." It seems as if Doody and Robinson anticipated by more than a century the observations of Major Velley (*Marine Plants*, 1795) and Stackhouse (Mem. & Corresp. of Sir J. E. Smith, i, 416–7), though not the more complete results of Carmichael (circ. 1822, unpublished; see Berkeley, Introd. Crypt. Botany, p. 231) and Thuret (1851).—G. S. BOULGER.

VIOLA ALPINA Huds. Fl. Angl. 331 (1702).—Turning over a volume of the *Botanical Magazine*, I dropped upon the following note in the description of *Viola biflora* (t. 2089): "Clusius mentions his having been informed that this violet was found in the mountains of the North of England, whence it has been supposed to be indigenous to this country. And in Solander's manuscripts it is said to have been found in the Welsh mountains. This does not however appear to have been confirmed, for it is not recorded as a British species in the *Compendium Floræ Britannicæ* of Sir James Edward Smith." The note in Solander's MSS. (in his own hand) runs: "*Viola biflora* Linn. Sp. Pl. 936 16: *Viola alpina* Huds. Angl. 331 5. Plantam anglicanam Raji eandem esse cum Viola biflora Linn. docuere specimina in montibus Cambriæ lecta." The entry in R. Syn. ed. 3, 366, is amplified from that in ed. 1, and is as follows: "Viola Martia Alpina folio tenello circinato. An fortè Alpina lutea? florem enim non vidimus. In rupe Clogwyn y Garnedh supra lacum Phynon lâs; *D. Lhwyd*. (Hanc plantam in montibus Cambriæ mihi ostendit *D. Lhwyd*, verum a Viola Martia inodora sylvestri C.B. me judice non differt; D. Richardson. Quo jure eam *Petiverii* H.B., 37, Violam rotundum luteam vocet, ipse viret." Petiver's figure (in his "Catalogue of Mr. Ray's English Herbal, illustrated with [often excellent] figures") is headed "Yellow Rock Violet," and bears the inscription "Wales, June." It stands in Hudson, ed. 2 (379), as "var. δ alpina" of *V. canina*—the species suggested by Petiver's figure, which has certainly no affinity with *V. biflora*.—James Britten.

Crocus vernus in the Isle of Wight.—So far as I am aware, there is no record of the occurrence of *Crocus vernus* in the Isle of Wight, and in Hampshire the only note in Townsend's *Flora* is of the record in Prof. Bell's Edition of White's Selborne "Holywater near the brook," the late Lord Selborne being the authority. On February 14th this year I saw the plant in vast abundance in a meadow, several acres in extent, at Freshwater, in this Island. It extended nearly over the whole field, and was a most lovely sight, the flowers even then constituting a purple haze, when seen from some distance away. On March 13th the effect was still more enchanting, the blossoms being well opened in the sunshine. Lord Tennyson says that he has known the plant growing there for fifty years past: how it has escaped the observation of the many botanists who have visited Freshwater during that period it is difficult to understand, but the early period of the year at which it blooms, and its absolute disappearance long before midsummer, may partly account for it. Though there are now cottage gardens adjoining the meadow, fifty years ago there were none, the neighbouring lands being then ordinary agricultural fields, either arable or pasture. I presume that the plant increases mostly by seed, and I found immature seed-vessels on March 13th.—Frederic Stratton.

Epilobium hirsutum × palustre and E. palustre × tetragonum in E. Kent.—Mr. R. H. Compton, of Cambridge, has sent me for examination three gatherings made by him on July 18th, 1913, in a fresh-water shingle-marsh near Dungeness Lighthouse, v. c. 15. The first is a form of *E. palustre* L., with very numerous, crowded, narrow leaves; this, I feel sure, is one parent of the other two. The second he has compared with my description of Mr. Waterfall's Cheshire hybrid (pp. 75–6); and he is confirmed in his original opinion that it is *E. hirsutum* × *palustre*. I fully agree; but the three sheets forwarded are considerably nearer to *E. hirsutum*, in foliage and general appearance, than the Cheshire specimen. A slightly immature capsule contains shrunken seeds. Magenta or crimson would be a better word than rose to express the floral colour. The third gathering consists of two rather small plants, which Mr. Compton independently suggested might possibly be *E. adnatum* × *palustre; E. tetragonum* 'L.,' Curt., var. *stenophyllum* Druce (*E. adnatum* Grisebach, forma *stenophylla* Haussknecht) grew at the spot. Their general habit is that of an *E. palustre* with crowded, narrow, erect foliage; but I am convinced that they cannot be that species, pure and simple. The leaves are erect, narrow, parallel-sided, more or less denticulate (in *E. palustre* they are always quite entire), and frequently somewhat adnate-decurrent; they also approach *E. tetragonum* in colour, texture, clothing, and especially in the venation of the lower ones. There are slight indications of decurrent lines on the slender, far less hairy stems; and the flowers look fairly intermediate. Capsules about half as long as those of the accompanying *E. palustre;* their pubescence more scanty, not so grey, nor so closely appressed. This is the first occurrence known to me of *E. palustre* × *tetragonum* as British, in a wild state, though a very different form of the hybrid occurred spontaneously in my garden at Milford, Surrey, in 1894; it was inadvertently included in the 10th edition of the *London Catalogue*. The Dungeness specimens may, perhaps, be due to a recrossing with *E. palustre;* but I do not think so, on the whole.—Edward S. Marshall.

REVIEW.

The Thirty-first Annual Report of the Watson Botanical Exchange Club, 1914–1915. Cambridge: J. Webb & Co.

This latest Report is, as usual, edited by Mr. George Goode, the Hon. Secretary of the Club, the task of distribution for the year having been undertaken by Miss Ida M. Roper, who is also one of the principal contributors of specimens. Miss Roper reports favourably both as to the quantity and quality of the specimens sent in; in the former respect Mr. J. E. Little, whose notes seem to us especially interesting, stands as an easy first with 691 specimens; Mr. J. W. White comes next with 369; and Miss Roper, Mr. Spencer Bickham, and the Rev. E. S. Marshall follow with 302, 287, and 283. The Report also contains Dr. Vigurs's sketch of the late F. H. Davey, with the portrait which we were allowed to reproduce in our January number.

As in the case of the Botanical Exchange Club, the Report is largely concerned with critical genera, the notes on which will mainly interest specialists. There are, however, a large number of observations of more general interest, and some of these, following our usual precedent, we proceed to quote. We note a tendency to reduce certain plants which have long occupied the position of varieties to the status of forms; this, we think, is a step in the right direction, based as it is upon observation. The plant identified by Mr. Wilmott as *Ranunculus Xatardi* Lapeyr., from a mill-yard at Portishead, "doubtless an alien," seems hardly to deserve the elaborate note devoted to it: there is, however, a gratifying absence of casuals, which sometimes receive an attention out of proportion to their importance.

Ranunculus [*peltatus* Schrank, *forma*]. Pond, Barrow Hill, N. Somerset, v.c. 6, May 30th, 1914. A small form with short peduncles and very hairy fruit. See Fl. Brist. (1912), p. 115.—Ida M. Roper. . . . The cutting of the floating leaves, the short pedicels, and the very hairy fruits take this plant away from *R. aquatilis* L. excl. varieties emend. Godron = *R. heterophyllus* Wiggers non Babington = *R. diversifolius* Gilibert *fide* Rouy & Foucaud = *R. peltatus* Schrank (*cf.* Moss in Journ. Bot., pp. 118–119, 1914), and take it towards *R. trichophyllus* Chaix in Villars emend. Moss *loc. cit.* If the plant is not a hybrid of *R. aquatilis* and *R. trichophyllus* (as above defined), I should put the specimen under the latter species. However, the flowers are larger than the common form of *R. trichophyllus* of the fens of eastern England, where, too, this species rarely develops floating leaves. I think the plant would be referred to *R. radians* Revel by some botanists, though personally I should question this identification. It also agrees with some plants which Babington referred to his own *R. heterophyllus*; but Babington's specimens of his *R. heterophyllus* are so varied that I seriously doubt the wisdom of those British botanists who retain Babington's name *R. heterophyllus*. Syme (Eng. Bot. ed. iii.) referred *R. aquatilis* and *R. trichophyllus* to the same aggregate species; and doubtless he had such intermediate plants as the present in mind when he did so. Such intermediate plants are not very rare; and if they are not hybrids Syme's view is a very reasonable one.—C. E. Moss.

Papaver Rhœas L., var. *Pryorii* Druce. Riddy Lane, Hitchin, Herts., v.c. 20, June 4th, 1914. Is this more than a *forma*? In 1914 I examined considerable areas of *P. Rhœas*, and in most of them some plants were to be found of this character with coloured hairs, sometimes brown rather than red, but different plants showed gradations between the uncoloured hairs and the most extreme forms of crimson.—J. E. Little. Corn poppies with crimson hairs to their peduncles must undoubtedly be assigned to var. *Pryorii* Druce. Those with coloured hairs of other tints have not, I believe, received distinctive names. Unfortunately, these colour distinctions are not stable in the herbarium, so it is to be feared that after a time all dried specimens of such varieties must come down to plain *P. Rhœas*.—J. W. White.

Radicula Nasturtium-aquaticum Rendle & Britten, var. *microphylla* Rendle & Britten. Boggy ground, Corfe Castle, Dorset, v.c. 9, June 5th, 1914.—Ida M. Roper. I believe so, but it is not (as we have it in Britain) a variety I have much faith in!—C. E.

Salmon. For me (and Mr. Britten agrees), this is only a starved *state*.—E. S. Marshall. A poor little variety, which J. D. Hooker calls "a starved terrestrial form." The specimens are right enough, for what we knew formerly as var. *microphyllum* Rchb.—E. F. Linton.

Arenaria tenuifolia L. Willbury Hill Gravel Pit, Hitchin, Herts., v.c. 20, June 8th, 1912. Except in the fact that the specimens marked A are nearly eglandular, and those marked B are slightly glandular-setose at the base of the calyx, there is no evident difference between the plants. Mr. C. E. Salmon (B.E.C. Rept., 1909, p. 442) remarks that Corbière says (Fl. Norm., p. 105) the number of stamens and length of capsule are not reliable characters for distinguishing these varieties. In these plants the number of stamens varies from 3–10, and the capsule, though mostly exceeding, occasionally only equals the calyx. In habit these plants are not nearly so robust or so much branched as the other sets from cultivated land now distributed. The proportion of slightly glandular plants is in this case much larger, about 40–50 per cent.—J. E. Little.

Portulaca oleracea L. In the damp sandy ground of Mr. Pritchard's Nursery Garden, Christchurch, S. Hants., v.c. 11, July 30th, 1914, where it has occurred for a few years past. Dr. C. E. Moss tells me it is quite a feature in fields in parts of Jersey, and very widely distributed in warm temperate countries.—E. F. Linton.

Carum segetum Benth. & Hook. fil. Early leaves. Willbury Hill, Hitchin, Herts., v.c. 20, June 5th, 1913, November 7th, 1913, and March 28th, 1914. The section of the petiole above the lowest pinnæ is like that of a quarter moon, as compared with that of *Pastinaca sativa*, which is reniform. There is some general resemblance in the leaves of the two plants, though the pinnæ of the former are more acute and more numerous than in the latter. By following up the leaves in clover and sainfoin fields in the autumn and spring, I find that, far from being a rare plant in this district as is stated in Pryor's *Flora of Herts.*, it is now at any rate very generally distributed, occurring sometimes in great quantity on cultivated ground, and sometimes on roadside waste and on hedge-banks. In one locality recorded by Coleman it has persisted at least sixty years.—J. E. Little.

Matricaria Chamomilla L. St. Ippolyts, Hitchin, Herts., v.c. 20, September 17th, 1914. Though common in the lower valley of the Lea, *M. Chamomilla* is very scarce in N. Herts. Pryor's *Flora of Herts.* has no records for the Ivel basin, in which St. Ippolyts lies. Abbot (*Flora Bedfordiensis*, 1798) speaks of it as common. So far as the parts of Beds. adjoining Herts. are concerned I have not yet found it, though it may occur on the light lands of the greensand. *M. inodora* is, in S. Beds., as with us, a universal weed, though not recorded by Abbot. Is it possible that he did not distinguish them? Or has some change in their distribution taken place?—J. E. Little.

Plantago Coronopus L., var. *pygmæa* Lange. (*fide* E. G. Baker).

Sandy cart ruts, Shouldham, W. Norfolk, v.c. 28, June 24th, 1914.—J. E. Little. A *forma*, I believe. Dr. E. J. Salisbury tells me he has grown this under careful cultural conditions, and that the offspring from seeds are quite large plants.—C. E. Moss.

Orobanche minor Sm. On clover, near Great Wymondley, Herts., v.c. 20, June 22nd, 1913. In 1913 the plant was in great abundance in a number of clover fields near Hitchin. In one locality on the G.N.Ry. it appears year after year on *T. pratense*, *Crepis virens* and other plants. One was growing on *Picris hieracioides*, which is plentiful at this spot. In Norfolk, near Cockley Cley, in light sandy soil, I was able last year to get up uninjured two plants with their hosts—*Erodium cicutarium*, and *Echium vulgare*.—J. E. Little.

Polygonum Convolvulus L., var. *subalatum* V. Hall. Weed in Rectory garden, Grey Abbey, Co. Down, September, 1914. It seems to be the common form here; leaves longer and narrower than in the type.—C. H. Waddell. Yes, this is var. *subalatum* Lejeune & Courtois Comp. Fl. Belg. ii. 59 (1831), which is an earlier name for var. *pseudo-dumetorum* H. C. Wats. It is the *P. Convolvulus* L. β. of Bromfield's Fl. Vect., p. 435 (1856), and is mentioned in the *Phytologist*, iii., p. 765 (1848).—E. G. Baker.

Populus alba × *tremula* ♂ (= *P. canescens* Sm.). Clack Mill, Westbury-on-Trym, W. Glos., v.c. 34, February 27th & July 24th, 1914.—Ida M. Roper. This is certainly *P. canescens* Sm., but there is no evidence of its being a hybrid between *P. alba* and *P. tremula*, and it occurs frequently in localities where the other species are not found. The leaves on the long shoots are tomentose beneath like these, the lower leaves being glabrous beneath.—A. B. Jackson.

Ceratophyllum submersum L. Pond, Castlemorton, Worcs., v.c. 37, September 22nd, 1914.—A. J. Crosfield. Yes; fruit very typical. Near tidal waters, where alone I have seen it, the habit is stouter and denser than in these specimens.—E. S. Marshall. By the name Dr. Moss gives this, I suppose he places it under *C. demersum*; continental authors, on the other hand, place it under *C. submersum*. *C. submersum* L., var. *apiculatum* Garcke = *C. apiculatum* Cham. in *Linnæa*, iv., ex Schumann Fl. Brasil. iii. 3, 749 (1894). But this plant must be placed under *submersum* (if the two species *submersum* and *demersum* are kept separate). It has not the fruit of *C. demersum*. . . .—A. Bennett. *C. demersum* L., var. *apiculatum* (Chamisso). There are (so far as my observations go) three distinct British forms of *Ceratophyllum*, namely, (1) *C. demersum* L. (sensu str.), (2) *C. submersum* L. (sensu str.), and (3) an intermediate form, *C. apiculatum* Chamisso. Though intermediate, the distribution of this last is against its being considered a hybrid. Authorities differ as to how these three plants should be arranged. Some reduce all three forms to a single species, *C. demersum* L. emend. Others retain two species, *C. demersum* and *C. submersum*. Of these, some place the intermediate plant under *C. demersum*, whilst others place it under *C. submersum*. Still others retain each as a species. I follow the majority of authors of recent continental floras in placing the intermediate plant as a variety of *C. demersum*.—C. E. Moss.

BOOK-NOTES, NEWS, &c.

Canon Henry Nicholson Ellacombe, whose death at the age of 94 took place on February 7th, was born at Bitton, Gloucestershire (near Bristol), on February 18th, 1822, and passed most of his life in that place; he became rector in 1850, in succession to his father, who had held the living for fifteen years and from whom he inherited his love of gardening. Sir Joseph Hooker, in his dedication of vol. cvii of the *Botanical Magazine*, refers to the "intelligent interest and zeal" of both father and son in introducing and cultivating "interesting rare and beautiful hardy plants." His garden, which he was always delighted to show to visitors, had been for a long period familiar to the horticultural world: of this he gave a charming account in the *Guardian* for 1900–1903, which was subsequently reprinted as a volume—*In a Gloucestershire Garden.* His best known work—*The Plant-lore and Garden-craft of Shakespeare*, first published at Exeter in 1878 and subsequently in London in 1884—had also appeared previously in serial form in the *Garden:* this is an excellent book, full of information concerning plants, their history, associations and names, on which last he published at Bath a small volume in 1870. Although he always refused to be regarded as a botanist, he had far more claim to that title—at any rate according to the Squeers definition—than many on whom it is conferred, for with regard to plants it might truly be said, "he goes and knows 'em." A charming companion and a delightful correspondent, Canon Ellacombe will be missed not only by folk who knew him personally but by those who had the privilege of receiving his letters. An appreciative notice by Mr. H. J. Elwes, accompanied by a portrait, appears in the *Gardeners' Chronicle* for February 19th.

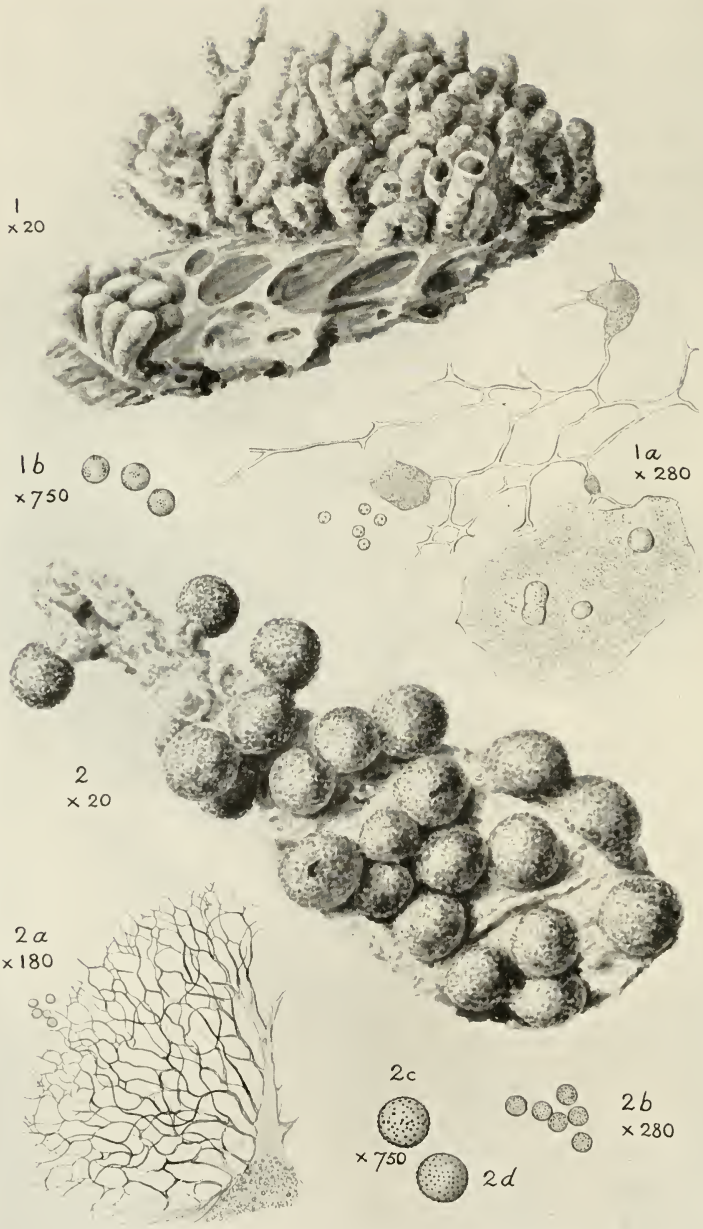
At the meeting of the Linnean Society on February 17th, the first communication was by Miss Carlotta Herring-Browne, entitled "John Bartram: the Pioneer American Botanist." Bartram was born on March 23rd, 1699, near Darby in County Delaware, Pennsylvania. His old stone farmhouse was built in 1731, soon after his thoughts by a chance occurrence during his labours had been turned to the structure of flowers. It was in the same year that his friend James Logan procured a copy of Parkinson's *Theatrum* from England as a present for Bartram, and this decided him to make excursions after plants into Maryland and Delaware. Of strong and untiring frame, neither danger nor difficulty kept him back. To receive and grow his discoveries he began before the end of the year to lay out the garden, the charm of which was felt by Washington, Jefferson, and Franklin. Three years later, at Franklin's suggestion, Bartram sent his diaries to Peter Collinson, in London, who, as a member of the Society of Friends, had connections with Pennsylvania. This correspondence, to the mutual benefit of both, lasted till the death of the elder man in 1769. Through Collinson he became known to Linnæus, Gronovius, Dillenius, Sir Hans Sloane, Dr. Solander, Lord Petre, Dr. Fothergill, and others. Many American trees were first sent to Europe by Bartram; amongst them being the *Taxodium distichum* still extant at Mill Hill, in Collinson's old garden. An even finer specimen, which died a few years ago, was 150 feet high, and 27 feet in girth; the trunk still stands in the Bartram Garden Park, Philadelphia. In 1769 Bartram was elected a member of the Royal Swedish Academy of Science at Stockholm, and the long letter he sent in acknowledgment is in the Society's possession among the Linnæan correspondence. He died when the United States were one year old, in his old house, on September 22nd, 1777. His life was shortened by the apprehension that his cherished garden might be laid waste by British troops, but his fears were not realised. This garden is now the property of the City of Philadelphia, and is supported as a public park. From time to time the members of the John Bartram Association, many of whom are his lineal descendants, meet to keep his memory green. The moss genus *Bartramia* is his botanical memorial. Miss Herring-Browne has devoted many months to searching for memorials of Bartram in this country, and has succeeded in finding many interesting letters and objects; these will be described in the complete work upon which she is engaged.

At the meeting of the same Society on March 2nd, Dr. Stapf spoke of the distribution of the Box, *Buxus sempervirens*, Linn., and especially on the relation existing between the English stations and its area on the Continent, supporting his remarks by lantern-slides (distribution-map and views of Box on Boxhill and in the Chilterns, the latter taken by Mr. John Hutchinson). He adopted Dr. Christ's views as to the character of the Box as a relict of the Tertiary flora of Southern Europe, and the discontinuous distribution as brought about, by disintegration of an old continuous and much larger area; but he could not share the view that the isolated stations in Western France are generally due to old plantations around castles and monasteries. These he considered relict stations like the English stations.

Not having had the opportunity of hearing Dr. Stapf's remarks, we are not aware whether he referred to the papers which have been published in this Journal on the subject of the distribution of the Box in England: in any case our readers may like to be reminded of R. A. Pryor's note on its occurrence in Buckinghamshire (Journ. Bot. 1887, 241) and of those of G. R. M. Murray and Messrs. Cedric Bucknall and W. G. Smith in Journ. Bot. 1901, 27, 29, 73.

Mr. J. H. Maiden, of the Botanic Gardens, Sydney, and Mr. H. H. W. Pearson, of the South African College, Cape Town, have been nominated for the Fellowship of the Royal Society.

It is from the *Daily Chronicle* that we get the last example of newspaper botany. From its issue of March 13th we learn that "The ash undoubtedly appears to the best advantage during this month, when its clusters of reddish flowers are replaced by 'the black buds o' March,' as Lord Tennyson called them." This would, we think, have astonished Tennyson.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G. Lister del.

1, 1*a*, *b*. Physarum digitatum. *G. Lister & Farquharson.*
2, 2*a–d*. Diachæa radiata. *G. Lister & Petch.*

NOTES ON SOUTH NIGERIAN MYCETOZOA.

By C. O. Farquharson and G. Lister, F.L.S.

(Plate 541.)

I.—Climate, Habitat and Collection Methods.

By C. O. Farquharson.

The majority of the species of Mycetozoa in the accompanying list were collected at Moor Plantation, Ibadan, the headquarters of the Agricultural Department of the Southern Provinces of Nigeria. The other localities mentioned are Agegé, Otta and Meko; some collecting was also done at Itu on the Cross River near the frontier of German West Africa.

In these districts, roughly speaking, two types of climate exist, a moist and dry; the moist climate is experienced in the south at Agegé and Otta, the dry at Ibadan. The Agegé and Otta districts adjoin each other, the former being on the Nigerian Railway, some twelve miles north of Lagos. The Bush, which affords a sure index of the climate of most districts, here approximates to a tropical rain-forest type. Over a great area, however, the forest has been cleared by the natives to make farms, and the district is perhaps the chief centre of cocoa-growing in the colony. Though the rainfall is somewhat less than that of Lagos, which averages about 70 to 80 inches, the humidity is still comparatively high; the Harmattan period of the year when the dry north wind blows is scarcely noticeable and does not make its presence felt by inflicting any special discomfort. The mean maximum shade temperature is about 85° F. The minimum rarely falls much below 70° F. In the wet season the days are, on the whole, cool, and the rains not too heavy or continuous. This season extends roughly from March to October, opening and closing with a series of tornadoes, which are short but often very violent thunder-storms accompanied by a hurricane of wind and torrents of rain. About August there is generally a break in the rains for two or three weeks, at which time the first crop of maize is harvested.

The southern provinces of Nigeria are of quite extraordinary fertility, in spite of the rather primitive and, on the whole, wasteful methods of agriculture. The commonest soil is a rather stiff red one of great depth and quite devoid of stones. In many places stones are such rarities as to be "ju-ju."*

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* Every year more and more bush is cut down, and one may walk for miles through native-owned cocoa plantations. All that remains of the forest is plentifully littered over the clearings in the form of logs and stumps in various stages of decay. It is in these clearings that fungus-hunting is most profitable, at least as far as the larger forms are concerned. In the forest large pileate Basidiomycetes are often nearly as hard to find as Myxomycetes and are, on the whole, less interesting. On the farm clearings, the fungus flora consists of a most depressing recurrence of *Polystictus occidentalis*, *P. cinnabarinus*, *P. Persoonii*, *Daldinia concentrica*, and the familiar *Xylaria polymorpha*. The monotony is occasionally relieved by a fine *Hexagonia*, and in one district (Meko) I was quite cheered to find that *P. cinnabarinus* has a somewhat rare and interesting "mimic," *Trametes punicea*.

Itu is a small station some distance up the Cross River, less than a day's journey by launch from Calabar. In the farm clearings the usual farm flora is found, but in the shade of the forest fringing the river and the tributary creeks, the myxo-flora, so far as I could judge in the time at my disposal, appeared to be quite rich.

Meko lies towards the Dahomey boundary, less than three full days' trek north of the large town of Abeokuta. It is largely a district of grass savannah, where elephant-grass (*Pennisetum purpureum* Schum.) grows five or six feet high. The monotony of the grass land is relieved by narrow strips of fringing forest along the sides of streams. The flora is of a swamp order of a special kind, for the rainfall although not above forty inches seems to be held up by a vast deposit of "pan" which occurs over a great extent of the district. At many places outcrops of this "pan" are seen to take the form of a polished crust of ironstone, such as is found in many parts of West Africa. The Phanerogamic flora of the Meko district is for this reason of a very distinctive character. Trees are few in number and in species, the most characteristic being the so-called African Oak, *Lophira alata* (*Dipterocarpaceæ*), and species of Acacia. I only managed to secure one myxo, *Physarum roseum*, in my very brief visit to the district.

Ibadan is 120 miles by rail north-east of Lagos. The climate is of an upland type, suited rather to cotton cultivation than to cocoa, though the latter can be grown along the sides of the numerous streams that intersect the country. The annual rainfall rarely exceeds 50 in.; the year 1914 was exceptionally dry, only 35 in. being recorded. When it is remembered that this included the fall of two tornado seasons which mark the beginning and end of the rains, during which perhaps a dozen tornadoes take place adding anything from half an inch to an inch in a few hours to the rainfall, it can be realised that this is rather a dry country, much drier than many parts of England. A continuous day's rain is uncommon, still less two or three wet days running. The dry season extends from November to March. During the whole of this time the rainfall may only amount to a small fraction of an inch; the sky is practically cloudless, and what breeze there is during the day is hot and parching. Very soon the Harmattan, a dust-laden wind which blows from the north, makes its presence felt on the mucous membranes; the boards of books left lying on the table inside one's quarters towards midday begin to bend upwards; the iron studs in the soles of one's boots get loose and drop out, and evening with its cool breeze comes as a relief. The nights are often very cold, and one has to guard against careless exposure to the sun by day or to the chill air by night. At this season 103° F. is about the highest shade record, and at night it may fall to below sixty degrees. The astonishing thing is that any vegetation contrives to keep alive. Yet the scrub though rather jaded in appearance still has a lot of life in it. Heavy night dews are of frequent occurrence; these no doubt mitigate the severity of the parching days, and explain why many plants survive. But before the Dog Star parches the fields and the

Harmattan becomes the White Man's burden, the earth has yielded her increase to those who made their demands on her, and has already in the proper season yielded the usual two crops of maize besides abundance of yams and cassava.

The greater part of the land at Ibadan must have been under cultivation at one time or another, but much of it when taken over by the Agricultural Department was under low scrubby bush, having been fallowed according to the usual native custom of allowing the land to revert to bush after about seven years' continuous cropping. Moor Plantation, in common with the whole of the Ibadan district, is plentifully sprinkled with Oil Palms (*Elæis guineensis* Jacq.). As they yielded food the natives held them sacred, and they were preserved when the rest of the bush was destroyed. Very striking they look on the cleared land, some of them seventy or eighty feet high, a great sight as they bend and sway under force of the tornadoes.

It happened that just before the wet season of 1913 a large number of oil palms had been cut down in clearing the land for the experimental plots. These were rolled away to be disposed of by fire when the dry season came round again. Some of them found a resting place in moist shaded places by the side of small streams. The richness of the palm myxo-flora is rather remarkable. Some of the species occurred on living palms at the bases of the dead outer leaves and dead male and female inflorescences, as I saw by examination of newly felled trees. *Hemitrichia Serpula* is frequently found on the queer mass of *débris* that collects at the base of the crown at sixty to eighty feet from the ground; *Physarella oblonga* seems to prefer the dead female inflorescence, *P. reniforme* the male. When the palm is felled under suitable conditions a great variety of species appear. The female inflorescence, or what remains of it after the nuts have fallen out, is a very bulky object, but on an evening in the wet season I have seen the greater part of the surface of one of them covered with the bright orange (palm-oil coloured, in fact), plasmodium of *Physarella oblonga*, which is perhaps the most striking of all the plasmodia that I have seen here; its sporangia are from their remarkable shape even more striking.

Myxo-collecting is in my case purely a spare-time occupation. The Nigerian evening is rather short, and as most plasmodia seem to emerge at this time, I have had very little opportunity to study them. Sporing is generally completed by morning. One of the most active of plasmodia is that of *Stemonitis herbatica* which I have once or twice brought in only to find in the morning that it had crawled on to the metal surface of the vasculum, and there formed sporangia. On several occasions I have found it useful to take advantage of this activity in order to secure good gatherings of forms whose plasmodia emerge from the soil. It is hopeless to try to send sporangia on soil through the post, unless they happen to occur on sun-baked worm-casts. Having found a plasmodium emerging from the soil in the evening, I have frequently laid "traps" for the sporangia in the form of small twigs or dried leaves laid lightly upon the plasmodium. Excellent specimens have been secured in this way. In one instance, in lieu of any better object, a Mantis ootheca which was lying on the ground near by (an old one) was utilised with complete success; next morning I found it all but covered with sporangia of *Diachæa leucopoda.*

A few notes may be given describing the methods I have used in preserving and posting these fragile specimens. Most of the difficulties may be overcome with the aid of patience, some medium strength mill-board and a supply of carpenter's glue. Cards are cut upon which the specimen with a reasonably large piece of the substratum can be glued. The card with the specimen attached can then be glued firmly to the bottom and sides of a strong cardboard or light wooden box. The whole can then be sent by post protected outside by shock-absorbing material of any convenient description. Dusty specimens with their cards should be enveloped in tissue paper before glueing the card to the transport box. Chip boxes are also useful for packing fragile specimens. Postal packets probably get no more handling than is necessary, but what they do get on this side at any rate is none too gentle.

What must strike anyone most who collects these lowly forms in the more remote parts of the world is their extraordinarily wide distribution. Quite a number of those that flourish near my quarters here I might have found at home in Aberdeenshire. Indeed one of the first objects that attracted my attention, when revisiting an old haunt while home on leave last year, was a fine specimen of *Tubifera ferruginosa.* I fear its presence there in a pine wood called up no sentimental longings for the land of the Oil Palm, for though Nigeria is by no means "the last place on earth" that it is supposed to be by many it holds no substitute for a pine wood, and no scent like that of the pine needles.

As to the relative abundance of the different species, it is difficult to speak with confidence from the limited experience that I have had. In a recent three weeks' trekking in a forest-covered district I seemed to meet nothing but *Ceratiomyxa. Fuligo septica* is perhaps the most ubiquitous here; it was the first to appear when the rains broke this year; *Stemonitis splendens* is very common especially in open clearings, frequently on the burnt surface of logs; *S. herbatica* is also widely distributed, but all these forms are very conspicuous and may be seen when others are missed.

In conclusion I must express my indebtedness to Miss Lister for all the help and encouragement she has given me. I fear the result, so far as my collection is concerned, is by no means proportionate. I must offer in excuse for the smallness of the collection pressure of official duties.

II. Notes on Mr. Farquharson's Mycetozoa.

By G. Lister.

The above account gives a graphic picture of the districts that have formed Mr. Farquharson's hunting-grounds in South

Nigeria. During the two and a half years of his residence there he has collected forty-three species of Mycetozoa, many of them represented by fine specimens. From his letters one gathers an idea of some of the difficulties with which he has had to contend in finding and preserving these fragile and often inconspicuous growths, such as the vicissitudes of a tropical climate, the ravages of insects and mould, and scanty leisure; even on trekking expeditions through the bush, lasting several days, collecting is not easy when the "carriers" must always be kept in sight among the maze of native paths. Such excellent results could not have been obtained without much patience and care, or without keen powers of observation.

Although a large number of species of Mycetozoa appear to be widely distributed, one is struck by the absence from Mr. Farquharson's list of some that are commonest in our temperate regions. The genera *Badhamia*, *Craterium*, *Didymium*, and *Trichia* are unrepresented. Of the large genus *Physarum*, five out of the ten species that he has found have not been obtained in Britain; all of them are new records for South Nigeria, and one, *Physarum digitatum*, is an entirely new species. Another species described here for the first time, *Diachæa radiata*, had previously been found in Ceylon; its distinctive characters are confirmed and strengthened by Mr. Farquharson's gatherings and observations.

Previous to his visit little attention had been paid to Mycetozoa in Nigeria, and indeed from the whole African continent comparatively few species have been recorded.

In 1846 a list of twenty-seven Mycetozoa found in Algeria was published by Durieu and Montagne in 'L'Exploration Scientifique de l'Algérie,' and these are the only records I know of from North Africa; several of the names quoted are of uncertain application; for example, the description of *Didymium vaccinum* Dur. & Mont. may refer to *D. Trochus* Lister, but in the absence of the type this is only conjectural; *Trichia chrysosperma* at the time when the above paper was written was the name applied to all the five species of the genus which have reticulated spores.

About twenty-two species have been recorded from time to time from the Cape Province and Natal. Welwitsch in 1855 obtained a few species in Angolaland; in 1905 Dr. Hubert Winkler made a small but interesting collection in the Cameroon district; in 1904 Mr. W. E. Freeman collected five species in South Nigeria.

The accompanying table gives a list of the Mycetozoa recorded from North, South, East and West Africa, and their general distribution in other parts of the world as far as our limited information extends. The letter F denotes that Mr. Farquharson was the first to record the species in West Africa; all other records are marked by a cross. The table is followed by a descriptive list of Mr. Farquharson's gatherings.

Table of Mycetozoa recorded from Africa, and their Distribution Elsewhere.	West Africa.	South Africa.	East Africa.	North Africa.	Europe.	India, Ceylon, Malaya.	Australia and New Zealand.	Japan.	North America.	West Indies.	South America.
Ceratiomyxa fruticulosa (Muell.) Macbr.	F	+	+	—	+	+	+	+	+	+	+
,, ,, var. *flexuosa*	F	—	+	—	+	+	+	+	+	+	+
Physarum melleum (Berk. & Br.) Mass.	—	+	—	—	+	+	+	+	+	+	+
,, *mutabile* (Rost.) Lister	+	—	—	—	+	+	—	—	—	—	—
,, *roseum* Berk. & Br.	F	—	—	—	—	+	+	+	—	—	—
,, *viride* (Bull.) Pers. var. *aurantium*	F	—	—	—	+	+	+	+	+	+	+
,, ,, ,, var. *rigidum*	F	—	—	—	—	+	—	+	—	+	—
,, *nucleatum* Rex	F	—	—	—	+	+	—	+	+	+	+
,, *pusillum* (Berk. & Curt.) Lister	F	+	+	—	+	+	+	+	+	+	+
,, *didermoides* (Ach.) Rost	+	+	—	—	+	+	—	+	+	+	+
,, *nutans* Pers.	—	+	—	+	+	+	+	+	+	+	+
,, *crateriforme* Petch	F	—	—	—	+	+	—	+	—	+	—
,, *compressum* Alb. & Schw.	F	—	—	—	+	+	+	+	+	+	+
,, *reniforme* (Mass.) Lister	F	—	—	—	—	+	—	+	—	—	+
,, *cinereum* Pers.	F	+	—	—	+	+	+	+	+	+	+
,, *gyrosum* Rost.	F	—	—	—	+	+	+	+	+	—	+
,, *sinuosum* (Bull.) Weinm.	—	—	—	+	+	+	+	+	+	+	+
,, *bogoriense* Racib.	+	—	+	—	+	+	+	+	+	+	+
,, *digitatum* G. Lister & Farquharson	F	—	—	—	—	—	—	—	—	—	—
Fuligo septica Gmel.	F	+	—	+	+	+	+	+	+	+	+
,, *cinerea* (Schw.) Morg.	F	—	—	—	+	+	—	+	+	+	—
Trichamphora pezizoidea Jungh.	F	+	+	—	+	+	+	+	—	—	+
Physarella oblonga (Berk. & Curt.) Morg.	+		—	—	?	+	—	—	+	+	+
Craterium minutum (Leers) Fr.	+	—	—	—	+	+	+	+	+	—	+
,, *aureum* (Schum.) Rost	?	—	—	—	+	+	—	+	+	—	—
Diderma subdictyospermum (Rost.) Lister	—	+	—	—	—	+	—	—	—	—	+
,, *effusum* (Schw.) Morg.	F	—	—	—	+	+	+	+	+	+	+
,, *globosum* (Pers.)	—	—	—	+	+	—	—	—	+	—	—
,, *radiatum* (L.) Lister	—	—	—	+	+	—	—	+	+	—	—
Diachæa leucopoda (Bull.) Rost.	+	+	—	+	+	+	+	+	+	+	+
,, *radiata* G. Lister & Petch	F	—	—	—	—	+	—	—	—	—	—
Didymium difforme (Pers.) Duby	—	—	—	+	+	+	+	+	+	—	—
,, *melanospermum* (Pers.) Macbr. var. *minus*	+	—	+	+	+	+	+	+	+	+	+
,, *nigripes* Fries var. *xanthopus*	—	—	—	+	+	+	+	+	+	+	+
,, *squamulosum* (Alb. & Schw.) Fr.	—	—	—	+	+	+	+	+	+	+	+
Mucilago spongiosa (Leyss) Morg.	—	—	—	+	+	—	—	—	+	—	+
Stemonitis fusca Roth	F	+	+	+	+	+	+	+	+	+	+
,, *splendens* Rost.	F	+	+	—	+	+	+	+	+	+	+
,, ,, var. *Webberi*	F	+	—		+	+	+	+	+	+	+
,, *herbatica* Peck	F	+	—	—	+	+	+	+	+	+	+
,, ,, var. *confluens*	F	—	—	—	+	+	—	—	+	—	—
Comatricha nigra (Pers.) Schroet.	—	—	—	+	+	+	+	+	+	+	+
,, ,, *pulchella* (Bab.) Rost. var. *gracilis*	+	—	—	—	+	+	+	+	+	+	+
,, *typhoides* (Bull.) Rost.	F	—	—	—	+	+	+	+	+	+	+
,, *longa* Peck	F	+	—	—	—	+	—	+	+	+	+
Lamproderma arcyrionema Rost.	F	—	—	—	+	+	—	+	+	+	+
Cribraria intricata Schrad. var. *dictydioides*	F	—	—	—	+	+	+	+	+	+	+
,, *languescens* Rex	F	—	—	—	+	+	—	+	+	+	—
,, *violacea* Rex	+	—	—	—	+	—	—	+	+	+	—
Dictydium cancellatum (Batsch) Macbr. var. *fuscum*	F	—	—	—	+	—	—	+	+	—	—
Tubifera ferruginosa Gmel.	F	—	—	—	+	+	+	+	+	+	+
Dictydiæthalium plumbeum (Schum.) Rost.	F	—	—	+	+	+	+	+	+	+	+

Table of Mycetozoa recorded from Africa, and their Distribution Elsewhere—(*continued*).

	West Africa.	South Africa.	East Africa.	North Africa.	Europe.	India, Ceylon, Malaya.	Australia and New Zealand.	Japan.	North America.	West Indies.	South America.
Reticularia Lycoperdon Bull.	F	—	—	+	+	+	+	+	+	+	+
Lycogala epidendrum (L.) Fr.	F	+	—	—	+	+	+	+	+	+	+
,, ,, var. *tessellatum*	+	—	—	—	—	+	+	—	+	—	—
Trichia favoginea Pers.	—	—	—	?	+	—	—	+	+	—	+
,, *varia* Pers.	—	—	—	+	+	+	+	+	+	—	—
,, *persimilis* Karst.	—	+	—	—	+	+	+	+	+	+	+
Oligonema nitens (Lib.) Rost.	—	—	—	+	+	—	—	—	+	—	—
Hemitrichia Vesparium (Batsch) Macbr.	F	—	+	+	+	+	+	+	+	+	—
,, *clavata* (Pers.) Rost.	+	+	—	+	+	+	+	+	+	+	+
,, *Serpula* (Scop.) Rost.	F	—	+	+	+	+	+	+	+	+	—
Arcyria ferruginea Sauter	—	—	+	—	+	+	+	—	+	—	—
,, *cinerea* (Bull.) Pers.	F	+	—	—	+	+	+	+	+	+	+
,, *denudata* (L.) Sheldon	+	+	—	+	+	+	+	+	+	+	+
,, *insignis* Kalchbr. & Cke.	+	+	—	—	+	+	+	+	+	+	+
,, *incarnata* Pers.	—	+	—	—	+	+	+	—	+	+	+
,, *nutans* (Bull.) Pers.	F	—	—	—	+	+	+	—	+	+	—
,, *Œrstedtii* Rost.	F	—	—	—	+	+	+	—	+	—	—
Perichæna depressa Lib.	F	—	+	—	+	+	+	+	+	+	—
,, *vermicularis* (Schw.) Rost.	F	—	—	—	+	+	—	—	+	—	—

Ceratiomyxa fruticulosa (Mueller) Macbride. Very abundant on decaying logs. In one instance the plasmodium was observed to be bright yellow in colour as it emerged in little rounded masses from bits of oil palm and other wood lying on the ground; the mature sporophores were pale yellow.

Var. *flexuosa* Lister; "very abundant on moist logs, not on palms; forming beautiful white masses nearly 6 mm. high."

Physarum roseum Berk. & Br. Found once in a thin strip of forest by the bank of a stream near Meko; it was in the plasmodium stage, and formed blood-red thread-like veins over the surface of a species of *Thelephora*; later it developed into typical crimson sporangia with short orange-red stalks.

P. viride (Pers.) Bull. var. *aurantium* Lister. Not uncommon at Ibadan on dead wood. Var. *rigidum* Lister; found several times in large masses on dead wood at Agegé, near Lagos; the sporangium-walls and almost tubular capillitium threads contain scanty deposits of orange lime-granules; the spores are rich purple-brown, 10 μ diam.

P. nucleatum Rex. Not uncommon on dead wood, stalks of palm leaves, etc.

P. pusillum (Berk. & Curt.) Lister. Abundant at Ibadan in August 1913; the sporangia formed patches a foot or two in length on the sheathes of oil palm; they occurred also on old cotton bolls. The specimens on palm sheathes have small sporangia which are often umbilicate above, and short yellowish-red or yellowish-brown stalks; those on cotton bolls have long red-brown stalks.

P. DIDERMOIDES (Ach.) Rost. Large growths were found at Ibadan in August 1915 developing from opaque white plasmodium on rough bark of trees and on smooth bark of lianes. They exhibit two strikingly different forms of growth. One is the form frequently met with in Europe, having loosely clustered sessile subglobose sporangia, grey or dirty white in colour, and often connected by strands of membranous hypothallus; the other form presents a very unusual appearance from the sporangia being flattened and closely united to form well-defined white plate-like masses 5 to 20 mm. across. Some of these show under a low magnification curious markings in the form of concentric circles. Both the scattered and united sporangia may occur near together on one strip of bark, and evidently all belong to one species. The spores and capillitium are alike in all.

P. CRATERIFORME Petch. Found in some abundance at Ibadan on the stalks of a pigeon-pea (*Cajanus* sp.). Mr. Farquharson sends interesting observations on the development of this species. He describes how the plasmodium appeared after the ground below the plant had been moistened by copious drippings or "cuckoo-spit" emitted by a large frog-hopper (*Ptyelus grossus* Fabr.); the insects puncture and suck moisture from the stalk of the pea, and exude it again in a shower of drops. Thus even in dry weather the ground beneath became sufficiently moist for the perfect development of the *Physarum*. The sporangia sent are globose and often umbilicate above; the short dark stalks and the lower part of the sporangium-wall contain deposits of small green alga-cells; the columellæ vary in shape and size, and are either hemispherical, clavate, or slender and cylindrical and reaching to the apex of the sporangium; they enclose lime-granules and alga-cells; the spores are pale violet-grey, 7 to 10 μ diam.

P. COMPRESSUM Alb. & Schw. Frequent at Ibadan on the decaying male inflorescence of oil palms and on old cocoa pods. The compressed sporangia are confluent in scattered groups of from two to twenty; the lime-knots are numerous and rounded; the dark grey clustered stalks enclose abundant refuse matter.

P. RENIFORME (Mass.) Lister. Fairly common at Ibadan, especially on the cut ends of oil palms. Very similar to the preceding species, but the sporangia are more lobed and undulate; the stalks are long, buff, and, in these developments, free from refuse matter, and the angular lime-knots are more or less combined to form a pseudo-columella.

P. CINEREUM Pers. Found once at Ibadan on decaying palm fibres on swampy ground, also on living herbaceous plants.

P. GYROSUM Rost. Ibadan. Large developments of cream-white plasmodium were found which matured on the stems of ground-nut (*Arachis*), grass, etc. A few sporangia are free and mounted on slender dull-red membranous stalks, but most are united to form extensive net-like plasmodiocarps, about 1 mm. high, and seated on a dull red hypothallus.

P. digitatum G. Lister & Farquharson, n. sp. (Pl. 541, fig. 1). Plasmodium greyish-yellow. Sporangia cylindrical, ascending, often branched or irregularly lobed, closely clustered, sessile, clay-coloured, 0·1 to 0·2 mm. diam., 0·5 to 1 mm. high, seated on a yellow membranous hypothallus; sporangium-wall membranous, with abundant deposits of clay-coloured lime-granules and with a few discoid calcareous crystalline bodies 10 to 20 μ diam. scattered among the granules; capillitium a network of hyaline threads, with few ovoid or angular yellowish-brown lime-knots: spores pale violet-grey, 5 to 5·5 μ diam., marked with small clusters of minute warts; from three to five of these clusters are seen on the hemisphere. *Habitat* on dead wood, Agegé, South Nigeria, August, 1914. Mr. Farquharson describes how he had the good fortune to catch sight of this very inconspicuous species as he was returning from an expedition after having lost his companions in the bush. It was on a piece of rotten wood in the plasmodium stage and matured in his collecting box on the way home. The sporangia form three or four clusters, 1 to 5 mm. diam., and are almost exactly the colour of the wood they are on. Some have developed imperfectly and are irregularly lobed, dull purple below and clay-coloured above. This species is distinguished from all others of the genus by the colour of the sporangia and lime-knots and by the very small size of the spores. In several species of Physarum the spore-markings take the form of clusters of warts; this is a constant character in *P. straminipes* Lister, and is seen less conspicuously and less constantly in *P. compressum* Alb. & Schw., in *P. pusillum* (Berk. & Curt.) Lister, and in *P. psittacinum* Ditm. In the present species the spores are distinctly spotted with small clusters of warts, but to what extent this is a reliable character we must wait for further gatherings to decide. *P. digitatum* is perhaps most nearly allied to *P. virescens* Ditm. The specific name refers to the finger-like clusters of sporangia.

FULIGO SEPTICA Gmel. Very abundant on decaying oil-palm logs, etc., "sometimes forming enormous æthalia."

F. CINEREA (Schwein) Morg. Found in some abundance at Ibadan on heaps of old cocoa-pods. The small pearl-grey pulvinate æthalia have remarkably little lime in the smooth cortex; they are scattered over the pods, and vary in diameter from 2 to 8 mm.; the capillitium is almost *Badhamia*-like; the brownish-purple spores are globose, 11 μ diam., or ellipsoid and 11 by 12 to 14 μ. Similar small grey æthalia have been obtained in the Phillipine Islands by Prof. Merrill.

TRICHAMPHORA PEZIZOIDES Jungh. Found on dead wood in thick bush, both at Agegé and Otta. They are magnificent specimens with the fragile saucer-shaped sporangia well preserved. The character of the capillitium is remarkably variable in this species; it may either consist of almost simple tubules filled throughout with lime-granules, or of a network of slender threads with or without lime-knots. The present gatherings have slender capillitium with few small lime-knots; the spores are pale purplish-grey, 7 to 9 μ diam., and minutely spinulose; in gatherings from other regions they are often much darker, rougher, and larger.

PHYSARELLA OBLONGA (Berk. & Curt.) Morgan. Mr. Farquharson found a beautiful development of this on worm-casts on the ground at Agegé; he also obtained it in rich, deep orange plasmodium at Ibadan on a palm-trunk and on the ground; part of this matured normally; part developing rather later under drier conditions broke up into irregular flat discoid masses with somewhat incurved margins; all stages between these and typical tubular, stalked sporangia were found. The capillitium is quite normal in all the specimens, consisting of numerous slender, sparingly branched hyaline threads, and large spike-like yellow lime-knots.

DIDERMA EFFUSUM (Schwein) Morgan. Found several times at Ibadan in large masses on dead leaves, and on the fibres of wine-palm (*Raphia vinifera* Beauv.), developing from watery pinkish-white plasmodium. The white sporangia are rounded and crowded, less often scattered and forming elongated plasmodiocarps.

DIACHÆA LEUCOPODA (Bull.) Rost. Ibadan, on roots of oil-palm, and in one case spreading over a *Crucibulum* that was growing on the palm; found also in great abundance on a heap of decaying hedge-clippings. The cylindrical sporangia are mounted on long white stalks nearly 1 mm. high; the spores are minutely warted, 7 to 8 μ diam.

Diachæa radiata G. Lister & Petch, n. sp. (Plate 541, fig. 2). Plasmodium orange-yellow. Sporangia closely gregarious or crowded, hemispherical or globose, 0·4 to 0·5 mm. diam., iridescent-grey or bronze, sessile, rarely shortly stalked, seated on a white hypothallus which either forms a continuous sheet or consists of branching radiating veins or small circular patches; sporangium-wall membranous, colourless: stalks when present short, stout, furrowed, 0·1 to 0·2 mm. high, white, and like the hypothallus densely charged with granules of lime: columella white, convex, conical or shortly cylindrical; capillitium a network of slender purple-brown threads radiating from the columella; spores pale violet-grey, spinulose, 8 to 11 μ diam. *Habitat* on dead leaves and sticks, Ceylon and Nigeria. This species was first collected in 1910 near Trincomalee, Ceylon, by Mr. E. Ernest Green, the Government Entomologist, who brought it to the Government Mycologist, Mr. Petch. The latter sent specimens to me expressing the view that it might be a new species on account of the sporangia being nearly all sessile and the spores larger, rather rougher, and paler than in *D. leucopoda*, its nearest ally. The numerous gatherings of this form obtained at Ibadan by Mr. Farquharson in the spring of 1915 fully establish its constancy; he supplies a further distinguishing character by his observation that the plasmodium is orange-yellow, not white as in *D. leucopoda*. He describes how it first emerges from the soil in circular patches formed of slender veins which branch and radiate in a somewhat dendritic manner, and cover an area from three to five inches across. He writes: "It had been living, I think, on decaying bean-stalks (*Dolichos* sp.), which had been dug into the ground for green manure. It emerged in the early morning and began to form sporangia at about 7 a.m." He adds that the white plasmodium of *D. leucopoda* which happened to develop about the same time always emerged in the evening, and the sporangia produced were much more scattered than in *D. radiata*. It is interesting that the two first gatherings of this species should come from such widely separated localities as Ceylon and W. Africa. The spores in the Ceylon specimen average 10 μ, and are rather paler than in those from Nigeria, which average 9 μ; they appear to be distinctly rougher than the spores of *D. leucopoda*. The columella is often almost or entirely free from deposits of lime-granules, and then consists of a slender colourless or pale-yellow membranous tube, from which many of the capillitium threads arise. Similar membranous columellæ are seen in *D. cylindrica* Bilgram, and *D. cæspitosa* (Sturgis) Lister; in the few gatherings that have been obtained of those two rare species calcareous deposits are absent, not only from the columella, but from the hypothallus also. The specific name *radiata* of the present species refers to the radiating branches of the plasmodium and hypothallus.

STEMONITIS FUSCA Roth. Not unfrequent at Ibadan. Two of the gatherings Mr. Farquharson sends are unusual forms: in one the capillitium is prickly with many long spines standing out from the close surface net; the other specimen, gathered on a prostrate oil palm, is a weak form of the var. *flaccida*; the drooping sporangia have an imperfect and very wide-meshed surface-net connected with the columella by few slender threads; the spores are purplish-grey when magnified, 7 to 8 μ diam., and closely reticulated.

S. SPLENDENS Rost. Abundant at Ibadan. One specimen consisted of a forest of sporangia 20 mm. high, covering an area of nearly fourteen square inches.—Var. *Webberi* Lister; found both at Ibadan and Agegé in fine condition.

S. HERBATICA Peck. Frequent at Ibadan and Agegé. Mr. Farquharson has collected beautiful specimens, and also sends a photograph showing tufts of sporangia covering the leaves and part of the stem of a living herbaceous plant.—Var. *confluens* Lister; Ibadan, immature when first found and forming masses of whitish convolute sporangia partly on the ground, partly on sticks and *débris*. These specimens closely resemble the previous gatherings of this curious convolute form that have been obtained in Britain, Ceylon, and New England; the capillitium consists of an irregular network of threads combined with plates or curved sheets of closer reticulation; there are no distinct stalks or columellæ; the pale spores average 7·5 μ, but many are much larger: it is clearly an irregular development.

COMATRICHA TYPHOIDES (Bull.) Rost. A large growth of scattered slender sporangia 5 mm. in total height was found at Agegé on dead wood. In many instances the membranous sheath of the stalk is chiefly developed along one side, and is supported by a row of stout, broad-based spines.

C. PULCHELLA (Bab.) Rost, var. *gracilis* Lister. Abundant at

Ibadan and Agegé, on dead wood and palm-fibre, also on herbaceous plants. This variety appears to be common in the tropics.

C. LONGA Peck. Ibadan. Mr. Farquharson writes: "The white plasmodium had, I think, emerged in a large mass from an oil palm lying on the ground, and had slid or dripped—such was its appearance—on to the neighbouring plants, where the sporangia formed masses six or seven inches across weighing the leaves down; some of the sporangia must have been at least an inch long. I tried to get a photograph to convey some impression of the size and appearance, but the sporangia were extremely soft, and photography in a draughty bungalow was a matter of extreme difficulty." The photograph conveys a far better idea of the hanging masses of sporangia as they grew than can be given by collected specimens, however carefully they may be packed. The sporangia are very slender; towards the apex the capillitium does not form a network, but is reduced to a spiral or to whorls of stiff branches spreading from the flexuose columella, and dividing into a few spine-like branchlets.

LAMPRODERMA ARCYRIONEMA Rost. Abundant at Agegé on dead wood; in one large growth the silvery sporangia are scattered over an area fourteen inches long by two to three inches wide.

DICTYDIUM CANCELLATUM (Batsch) Macbr., var. *fuscum* Lister Fairly common at Ibadan and at Agegé, on dead wood forming large developments. The brown membranous cup at the base of the sporangium is usually small and may be absent.

CRIBRARIA INTRICATA Schrad., var. *dictydioides* Lister. Ibadan; a single large and perfect growth was found on dead wood.

TUBIFERA FERRUGINOSA Gmel. Ibadan, found inside a hollow palm stem. When moist the masses of sporangia were reddish-copper coloured with a metallic lustre.

DICTYDIÆTHALIUM PLUMBEUM (Schum.) Rost. Ibadan; eleven small pinkish ochre or drab æthalia are sent; the minute component sporangia are 0·2 to 0·3 mm. high, 0·09 mm. broad.

RETICULARIA LYCOPERDON Bull. Several æthalia were found at Agegé on a decaying stump of oil palm: the largest was 1·5 inches across.

LYCOGALA EPIDENDRUM (L.) Fries. Abundant at Ibadan and Agegé on dead wood.

HEMITRICHIA VESPARIUM (Batsch) Macbr. Ibadan; found once in a very moist hollow stump of an oil palm: small clusters of typical purplish-red sporangia are scattered over the wood and enclose coils of very spinose capillitium.

H. CLAVATA (Pers.) Rost. "Common on palms and other stumps; emerging as coral-pink plasmodium, and becoming maroon-red then brown as the sporangia matured."

H. SERPULA (Scop.) Rost. Common at Ibadan on dead bark; the orange-yellow net-like plasmodiocarps often formed conspicuous objects covering several square inches. Mr. Farquharson writes that a very fine plasmodium of this species emerged from some fragments of dead wood which he had kept moist in a glass dish, and matured normally.

Arcyria cinerea (Bull.) Pers. Common at Ibadan and Agegé; the white plasmodium emerged in small scattered masses on much-decayed logs. The stalks of the grey cylindrical sporangia are usually combined in clusters of three to eight; it belongs therefore to the forma *digitata* so often met with in the tropics.

A. denudata (L.) Sheldon. Common at Ibadan and Agegé on dead wood.

A. nutans (Bull.) Grev. Ibadan.

A. Œrstedtii Rost. Ibadan, fairly common and forming fine growths on dead wood. One specimen developed irregularly; the rose-red cylindrical sporangia are seated as usual on a membranous hypothallus, but are almost prostrate and where broken are seen to be penetrated by a central tubular air-space; the half-ring-shaped thickenings of the capillitium are more prominent than usual, and the network of threads shows many swollen free ends.

Perichæna depressa Lib. Common at Ibadan on dead wood of Dicotyledons; in one instance it was found on dead roots some distance under the soil. The red-brown lid-like upper walls of the flattened sporangia easily fall off exposing shining membranous inner walls; the tubular threads of the capillitium measure 2 to 3 μ diam., and are regularly thickened on the inside with close-set transverse rings about 2 μ apart; on the outside the threads are either smooth or marked with irregular shallow constrictions: this internal thickening of the capillitium tubes is characteristic of *P. depressa.*

P. vermicularis (Schwein.) Rost. Ibadan; on dead bark and on old cotton bolls; the slender buff-brown sporangia are either short and curved or form more or less extensive net-like plasmodiocarps.

Description of Plate.

Fig. 1. *Physarum digitatum* G. Lister & Farquharson, clusters of sporangia; 1 *a*, capillitium and spores with a fragment of sporangium-wall in which three crystalline discs are embedded; 1 *b*, three spores.—Fig. 2. *Diachæa radiata* G. Lister & Petch, a group of sporangia seated on a layer of hypothallus from South Nigeria; 2 *a*, portion of the network of capillitium attached to a columella which contains no lime-granules except at the base; 2 *b*, group of spores; 2 *c*, spore of South Nigerian specimen; 2 *d*, spore of specimen from Ceylon.

NOTES ON THE FLORA OF DERBYSHIRE.—IV.*

By E. & H. Drabble.

Since the appearance of our last article on the Flora of Derbyshire much field-work has been done in the north and east of the county. In the accompanying list twenty-three records of species or varieties hitherto unrecorded for the county are given, and seventy new for their respective districts. These numbers are exclusive of casuals. Unestablished aliens that seem likely to spread are listed. It seems desirable to have a note of the appearance of such plants, as they may become in the future real competitors with the native plants. Several aliens have become thoroughly established and have spread widely during the last ten years. For example, *Matricaria suaveolens* now occurs abundantly, not only in the neighbourhood of towns and villages, but also far from cultivated areas. *Lycium* is also greatly on the increase. *Sisymbrium pannonicum*, of which a single plant was first seen as a roadside alien near Rowsley in 1910, is now abundant in many other places, and is established in its first mentioned station. A curious feature in the Chesterfield district is the disappearance of *Senecio Jacobæa* from many fields and tracts of waste land where it was extremely abundant a few years ago. The disappearance has been very rapid and is difficult to account for. On the other hand certain plants have become common in districts where they were formerly unknown; thus, in the Chesterfield district *Epilobium roseum* was apparently absent until a few years ago, but is now quite common.

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* See Journ. Bot., 1909, pp. 199–207; 1911, pp. 313–317; 1913, pp. 5–11.

Clematis Vitalba L. Does not appear to be native anywhere. It is occasionally cultivated, as at Spital (C), and is becoming naturalised at Matlock (L). That it does not occur as a native of the Limestone districts is rather surprising.—*Ranunculus fluitans* Lam. var. *Bachii* (Wirtg.). (*Y) Hope.—*R. peltatus* Schrank. (L) Arborlow.—*R. Lenormandi* F. Schultz. (G) Stanage. —*R. hederaceus* L. (C) Nether Loads.—*Helleborus fœtidus* L. First recorded from Matlock in W. H. Purchas' MS. list (1865); it still grows freely there.

Berberis vulgaris L. Very rare, and when it does occur it is generally in shrubberies; (C) Spital, Hasland; (G) Riber.

Corydalis claviculata DC. (C) Wingerworth Bole Hill.—*Fumaria Boræi* Jord. (C) Totley. Only once previously recorded for the county.

Radicula Nasturtium-aquaticum Rend. & Brit. var. *siifolia* Druce. (*G) Nether Loads.—*Arabis hirsuta* Scop. (G) Ashover Hill Top.—*A. albida* Stev. (*C) Established near Stretton.—*Erophila verna* E. Meyer. (L) Milltown.—*Cochlearia alpina* Wats. (L) Middleton-by-Wirksworth.—*Sisymbrium pannonicum* Jacq. (*C) Waste ground at Calow.—†*Sisymbrium Columnæ* Jacq. (*C) Waste ground at Calow.—†*Brassica Rutabaga* DC. (*L) Eyam. —*Thlaspi arvense* L. (*C) Calow.—*Iberis amara* L. (*C) Waste ground near Chesterfield. With the ordinary form were curious pædogenetic plants about 1 inch in height, bearing from 1 to 3 flowers.—*Raphanus Raphanistrum* L. (G) Dethick.

Reseda lutea L. (*L) Middleton-by-Wirksworth.—*R. Luteola* L. (L) Milltown.

Helianthemum Chamæcistus Mill. (P) Stoney Houghton.

Viola odorata L. (P) Glapwell; (L) Ashover, the blue flowered plant; the white flowered plant is generally commoner in North Derbyshire.—†*V. nemorosa* Neum. W. & M. (*C) Wingerworth.—

V. ericetorum Schrad. (*C) Wingerworth.—*V. obtusifolia* Jord. (P) Steetley; (G) Ashover Fabric.—*V. agrestis* Jord. (P) Steetley, New Houghton; (C) Heath, Calow, Old Brampton; (G) Stanage, Dethick.—*V. Lloydii* Jord. (C) Cowley Bar.—*V. lutea* Huds. This plant, which occurs abundantly on L, also occurs on G near Birchover and Ashover; on this formation it is rather different from the L form, having broader leaves and shorter flowers.

Polygala oxyptera Reichb. (L) Eyam.—*P. serpyllacea* Weihe. (L) Ashover; (G) Dore Moor. Dore Moor, according to the Geological Survey Map, lies chiefly on the Lower Coal Measures, but the coating is so thin that the Grit shows through it in many places, and its plant-formations are quite typically those of the Grit. The same thing is true for parts of East Moor.

†*Saponaria Vaccaria* L. (*C) Waste ground at Calow.—*Silene Cucubalus* Wibel. var. *puberula* (Jord.). (C) Ashgate, Lower Hady. —*Lychnis dioica* L. (C) at Locoford with glabrous shining leaves. We cannot find any description that fits this plant. †*Arenaria leptoclados* Guss. var. *viscidula* R. & F. (*G) Lea.—*Sagina nodosa* Fenzl. var. *glandulosa* (Bess.). (*G) Burbage Valley. —*Spergula arvensis* L. (C) Handley.—*S. sativa* Boenn. (G) Dethick; (*P) Elmton.—*Stellaria apetala* Ucria. (*C) Walton.

Hypericum humifusum L. Common on sides of rough moorland paths on the Grit. (G) Loads, Lea, Riber, Dethick. *H. perforatum* L. var. *angustifolium* DC. (*L) Crich.—*Geranium sanguineum* L. (*G) Lea; hitherto only known from L.—*G. pyrenaicum* Burm. fil. (L) Castleton, Ashford-in-the-Waters.—*Geranium molle* L. † var. *æquale* Bab. (*C) Boythorpe.—*Impatiens parviflora* DC. (*C) Ambergate, fully established.

Genista tinctoria L. (C) Pratt Hall, Lower Hady; (L) Starkholmes.—*Medicago lupulina* L. var. *Willdenoviana* (Koch). (P) Bolsover, Elmton; † "s-var." *eriocarpa* Rouy (*G) Holloway. (We think both *eriocarpa* and *Willdenoviana* should rank as varieties; a sub-variety, in Rouy & Foucaud's sense, seems to be merely what we generally term a *state*; while these plants are, in our opinion, of distinctly higher rank.)—*Melilotus alba* Desr. (C) Dore; (there are only two previous records).—*M. indica* All. (*P) Steetley; (*C) Calow, Boythorpe. (No previous record for North Derbyshire.)—*Vicia sepium* L. † var. *ochroleuca* Bast. (*C) Lower Hady, Ogston.

Spiræa Ulmaria L. var. *denudata* Boenn. (*C) Ambergate; Totley, Cowley Bar, Somersall; (*L) Cromford. (On the subject of hairiness in *Spiræa Ulmaria*, Prof. Yapp's interesting paper in *Annals of Botany*, vol. xxvi, July, 1912, pp. 815–870, should be consulted.) *Alchemilla pratensis* Schmidt. (C) Dore.—†*A. minor* Huds. (*C) Spital, Wooley Moor, Wingerworth; (*G) Northedge.—*A. alpestris* Schmidt. (L) Middleton Dale. The plant recorded (Journ. Bot., October, 1911, p. 314) as *A. vulgaris* L. var. *filicaulis* (Buser) would seem, by comparison with Lindberg's monograph, to come under *A. minor* Huds., and the same is probably true for the plants recorded as var. *filicaulis* in the "Flora." *Agrimonia Eupatoria* L. var. *sepium* Bréb. (*C) Cordwell.

Sedum album L. (*C) Barlow (established).—*Sempervivum tectorum* L. (*C) Established at Holymoorside, Barlow, Old Brampton.

Epilobium angustifolium L. (*P) Bolsover; (C) Brimington, with very pale pink flowers.—*E. hirsutum* L. (C) Brimington with very small pale pink flowers. *E. parviflorum* Schreb. var. *subglabrum* Koch. (*C) Brimington; (*L) Cromford. (The same plant was previously recorded by us from Langwith as var. *rivulare*, which, according to Rouy & Camus, is of hybrid origin.)—*E. roseum* Schreb. Until a few years ago this plant was almost unknown in the Chesterfield district (C) although it occurred at Holymoorside. It seems to have spread down the Hipper Valley and is now plentiful in the adjoining Rother Valley also.—*E. tetragonum* L. (*L) Millers Dale; extremely rare in the county.

Conium maculatum L. (C) Brimington.—*Carum Petroselinum* Benth. & Hook. fil. (C) Boythorpe (established).—*Pimpinella major* Huds. (P) Ault Hucknall, Rowthorn, Glapwell, Palterton. In this district it grows to a height of five feet. † Var. *rosea* Druce. (*P) Roseland Wood. (This is merely a colour variety.)—*P. Saxifraga* L. Plants with the leaf-characters of var. *dissecta* With. but with bright crimson flowers, occurred at Starkholmes (L.). The advisability of naming colour-varieties is doubtful, but colour would appear generally to be as good a character as leaf dissection. Hence the name *P. Saxifraga* L. var. *roseiflora* (nov. var.) is suggested, which may be described as follows: a var. *dissecta* With. differt floribus intense roseis. *Myrrhis Odorata* Scop. (C) Lydgate.—*Æthusa Cynapium* L. † var. *agrestis* Willr. (*C) North Wingfield. This plant hardly seems to be worthy of varietal rank; we believe it to be a mere state, all transitions between the ordinary form and var. *agrestis* both in stature and in involucels occur.—*Heracleum Sphondylium* L. var. *angustifolium* Huds. (C) Old Brampton, Stretton, Holymoorside. We have never found the extreme form bearing perfect fruit.

Galium Cruciata Scop. (C) Old Brampton; tall forms with well-marked anisophylly, the leaves towards the light being much larger than those towards the bank on which the plants were growing.—*G. Mollugo* L. † var. *insubricum* (Gaud.). (*P) Elmton.—*Sherardia arvensis* L. (P) Shirebrook.

Valeriana officinalis L. (*Mikanii* Syme). (C) Nether Loads; (G) Holloway; (L) Middleton-by-Wirksworth.—*V. sambucifolia* Mikan. (C) Freebirch.—*Valerianella dentata* Poll. (P) Stoney Houghton.

Solidago Virgaurea L. (G) Holloway, with pale cream-coloured flowers; (P) Langworth Wood, Roseland Wood; (C) Unthank.—*Anthemis nobilis* L. Rare in the County. (C) Boythorpe; (only one previous Coal Measure record).—*Matricaria inodora* L. † var. *phæocephala* Rupr. (*C) Handley.—*M. suaveolens* Buchanau. Spreading rapidly in North Derbyshire, especially on the Coal Measures. (*P) Steetley.—*Artemisia Absinthium* L. (C) Woodthorpe, probably wind-sown but thoroughly established.—*A. vulgaris* L. † var. *coarctata* Forsells. (*C) Spital.—*Senecio syl-*

vaticus L. † var. *auriculatus* Meyer. (*C) Spital.—*S. viscosus* L. (C) Boythorpe; very rare in the County.—*S. erucifolius* L. The distribution is peculiar and very seldom do *erucifolius* and *Jacobæa* grow together, one disappearing suddenly and the other appearing in passing from district to district. In the Heath district (C) for instance *erucifolius* is abundant and no *Jacobæa* has been seen; to the south and west *Jacobæa* replaces it. At Cordwell (C), where both grow, there are curious intermediates which may possibly be hybrids.—*S. Jacobæa* L. var. *flosculosus* (Jord.). (*C) Wingfield.—*Arctium nemorosum* Lej. (*P) Steetley; (*C) Wooley, Holymoorside; (*G) Holloway.—*A. minus* Bernh. (P) Ault Hucknall; (C) Heath, Clown.—† var. *purpurascens* Blytt. (*P) Stoney Houghton.—*Carduus nutans* L. (P) Steetley; very common on the Permian and Carboniferous Limestones, but very rare elsewhere.—*C. crispus* L. (P) Steetley; (G) Alderwasley Woods. Common on the Limestones but uncommon elsewhere.—*Cirsium heterophyllum* Hill. (G) Dore Moor.—*Centaurea nigra* L. (C) Sutton; dwarf plants 1–4 in. in height, like those growing at the Lizard; these appear to be merely *states*.—*Crepis capillaris* Wallr. (*C. virens* L.) var. *agrestis* (W. & K.). (*L) Bradwell.—*Picris hieracioides* L. (*G) Ashover Hay; (this is really the first record for G, as that given in the "Flora" for Fallgate is really on L.) (L) Milltown, Middleton-by-Wirksworth (extremely abundant).—*Tragopogon minus* Mill. (P) Steetley.

Jasione montana L. (G) Holloway.—*Campanula Trachelium* L. (P) Palterton, Ault Hucknall.—*C. latifolia* L. (P) Ault Hucknall. *C. rotundifolia* L. † var. *lancifolia* Mert. & Koch. (*G) Dore Moor and elsewhere on the moors, but passing into the typical form.

Lysimachia Nummularia L. (C) Grange Hill, Stainsby.

Gentiana Amarella L. (C) Dore; there is no record for C since 1789 (Pilkington).

Symphytum peregrinum Ledeb. (L) Middleton-by-Wirksworth. *Myosotis palustris* Hill var. *strigulosa* (Reichb.). (*P) Hardwick; (*C) Walton, Chesterfield; (*Y) Haddon.

Verbascum phlomoides L. (*C) Handley (as a casual).—*V. Thapsus* L. (C) Unstone; no record for C since 1829 (Glover).—*Linaria vulgaris* Mill. † var. *latifolia* Bab. (*P) Whaley.—*L. minor* Desf. (P) Stoney Houghton.—*Antirrhinum majus* L. (L) Thoroughly established on the rocks at Matlock.—*Veronica Anagallis-aquatica* L. (P) Scarcliffe; on L we have only seen var. *anagalliformis* (Bor.)—*V. arvensis* L. † var. *nana* Poir; (*Y) Haddon; (*L) Castleton. We believe this to be merely a stunted *state*.—*Euphrasia Rostkoviana* Hayne. (C) Wilday Green; (G) Cathole, Burbage Valley.—*E. campestris* Jord. (*C) Dore; (*G) Dethick; (*Y) Wensley; (L) Middleton-by-Wirksworth, Castleton, Via Gellia, Starkholmes.—*E. Kerneri* Wettst. (*P) Scarcliffe Park Wood, Barlborough; (C) Wilday Green, Brackenfield; (G) Ashover Hay, Big Moor, Riber, Burbage Valley; (L) Middleton-by-Wirksworth, Castleton, Fallgate, Arborlow, Via Gellia, Starkholmes.—*E. curta* Wettst. † var. *glabrescens* Wettst. (*G) Big Moor.—*E. nemorosa* H. Mart. † var. *ciliata*

Drabble; (*P) Scarcliffe Park Wood; (*C) Holmesfield; (*G) Ashover Hay, Wooley Moor; (*L) Arborlow, Monsal Dale, Fallgate. *E. stricta* Host. (L) Via Gellia.—*E. brevipila* Burnat & Gremli. (*C) Sutton Wood.—† var. *subglabra* Wettst. (*G) Lower Burbage Bridge.—*E. borealis* Townsend. (*C) Old Brampton; (L) Eyam, Castleton.—*Melampyrum pratense* L. † var. *hians* Druce. (*G) Cathole.

Lathræa Squamaria L. (L) Ashover, abundant; both the cream coloured and the purplish forms.

Origanum vulgare L. † var. *megastachyum* (Link). (*L) Lathkill Dale; looking very distinct in its extreme form, but apparently passing into the type; the white-flowered plant (var. *albiflorum* Lej.) occurs at Lathkill Dale and elsewhere.—*Calamintha officinalis* Moench. (*Satureia Calamintha* Scheele). (*C) Barlow Lees.—*Stachys arvensis* L., described in the "Flora" as "rare," is fairly common in the Chesterfield district; (P) Stoney Houghton; (C) Boythorpe, Handley, Heath.—*Lamium maculatum* L. † var. *laevigatum* (L). (*L) Pindale, far from cultivation; all the *maculatum* seen in gardens in Castleton and Bradwell was the form with spotted leaves.

Chenopodium album L. var. *candicans* (Lam.). (C) Pædogenetic plants about $\frac{3}{4}$ in. in height, in some cases with only a single terminal flower, on waste ground at Boythorpe.

Polygonum Persicaria L. (C) Pædogenetic plants about 1 in. in height and with few (three or more) flowers at Boythorpe.—Var. *elatum* G. & G. (C) Spital.—*P. Convolvulus* L. var. *subalatum* L. & C. (*C) Totley.—*Rumex alpinus* L. Hartm. (C) Stainsby, Holymoorside, Wingerworth, Walton, Smeetley Wood; (G) Stanage.

Euphorbia exigua L. var. *retusa* DC. (C) Heath.—*Humulus Lupulus* L. (C) Pratt Hall. The hop is decidedly rare in North Derbyshire.—*Urtica urens* L. (C) Boythorpe; very few records for the Coal Measures have been published.

Ceratophyllum demersum L. (C) Ambergate; there is only one previous record from C.

Orchis ericetorum Linton. (G) Stanage.—*Epipactis atroviridis* W. R. Linton. (C) Wingerworth Bole Hill.—† *Habenaria bifolia* Br. (G) Cathole; found by W. Jacques, Esq., J.P., who took one of us to see the plant. The only previous record for G is "Newfields near Chapel," by T. Gisborne in the marginal notes (1790–1795) in a copy of Hudson's *Flora Anglica*. There are five other records from different districts. No specimens for confirmation seem to be in existence, however, and Mr. Linton wrote: "None of the above are certainly *H. eu-bifolia*; . . ." This seems therefore to be the first definite record for the county. "Butterfly orchids" have been found in Scarcliffe Park Wood (P) by Mr. S. Steele, formerly secretary of the East Derbyshire Field Club, and by Miss Eaton in Linacre Wood; but not having seen specimens we are unable to say whether these were *bifolia* or *chloroleuca*.

Luzula pilosa Willd. (G) Alton.—*L. multiflora* DC. var. *congesta* (Lej.). (G) Stanage.

Typha latifolia L. (C) Apperknowle.

Triglochin palustre L. (G) Cathole.

Eriophorum vaginatum L. (G) Stanage.

Agrostis alba L. † var. *major* Gaud. (*C) Nether Loads.—*Deschampsia cæspitosa* Beauv. † var. *longiaristata* (Parn.). (*G) Harewood Grange.—*Brachypodium pinnatum* Beauv. † var. *corniculatum* (Lam.). (*P) Ault Hucknall, Elmton, Shirebrook.—*Agropyron repens* Beauv. var. *Leersianum* Gray. (P) Stoney Houghton; (L) Matlock.

Asplenium Trichomanes L. (G) Holloway.—*A. Ruta-muraria* L. (C) Old Brampton.—*Athyrium Filix-fœmina* Roth. † var. *erectum* Syme. (*G) Upper Loads.—Var. *incisum* (*C) Nether Loads.—*Ophioglossum vulgatum* L. (C) Woodthorpe.

Equisetum sylvaticum L. (C) Nether Loads.—*Lycopodium clavatum* L. (*C) Wingerworth Bole Hill; discovered by Mr. W. Waddington, who took one of us to see it growing. The old record from Breadsall Moor is given under C in the "Flora," but Breadsall is not on the Coal Measures.

In the above list L stands for Carboniferous Limestone, Y for Yoredales, G for Millstone Grit, C for Coal Measures and P for Permean; new County records are marked with a dagger and records new for their particular division are starred.

WILLIAM PEETE AND HIS HERBARIUM.

By Spencer H. Bickham, F.L.S.

A few years ago I bought a Herbarium of British plants of singular interest as it contains a specimen (or in the case of some of the rarer species two or three specimens) of most of the species known to British botanists during the years 1807–1844, when the collection was formed. There was no list: only a book recording the donations of most of the best known British botanists of the day. With considerable difficulty I have discovered that the collection was formed by William Peete (1771–1848), F.L.S., 1794, a surgeon at Dartford from 1795 to 1833, when he retired to Keston Heath and thence to Bromley, where he died on February 4th, 1848, in his seventy-seventh year. His herbarium was enriched by contributions from more than forty botanists, among whom were Sir W. J. Hooker, C. C. Babington, G. S. Gibson, G. E. Smith, Joseph Woods, James Backhouse, W. Borrer, David Don, W. Wilson, J. S. Henslow, James McNab, and W. Pamplin: with the last three he seems to have been on terms of intimacy. His own gatherings were apparently almost entirely confined to the neighbourhoods in which he lived, and it seems strange that he was able to enlist the sympathies of so many botanists when he had so little to offer in exchange, unless perhaps his knowledge of the localities for *Orchis hircina* and *O. Simia* (see Phyt. i, p. 587) helped him. I possess a fine specimen of *O. hircina* gathered by him at Wilmington, near Dartford, in 1807, which has a flower spike fifteen inches long, as well as other examples of later dates.

All the specimens in the Herbarium were neatly sewn on paper 13×8 inches with a druggist's label affixed to each sheet, but fortunately the original label that accompanied the specimens sent him was pasted on the back of each sheet. His own labels giving accurately name, locality and date are written on scraps of paper without even an initial to show who was the collector, and I had almost given up the hope of ever discovering the author until I showed Mr. Britten one which was written on the back of part of an envelope, upon the face of which was ". . . ete esq." Mr. Britten suggested "Peete"—the names, places, dates fitted accurately, and it only remained to obtain a copy of Peete's autograph: this was supplied by a reference to the Roll and Charter Book of the Linnean Society, which body he joined in 1794.

Although he published little, Peete was evidently a good botanist, as is shown by his careful description for E. Bot. 2748 of *Silene patens* (*S. italica* Pers.) which he added to the British Flora. The specimen figured by Sowerby was sent to him from Dover by Peete, who found it there in 1825, and evidently grew it, as he remarked that its characters remained unchanged by cultivation: the figure and description did not appear until 1832. The obituary notice of him in Proc. Linn. Soc. i, 377, says: "Mr. Peete was well acquainted with British plants, to the study of which he more particularly attached himself, especially of the rarer species of the neighbourhood in which he lived, and his opinion on all questions regarding them was deservedly treated in great respect." He seems to have been the first to find *Veronica Buxbaumii*: see New Bot. Guide, 578 (1837).

NOTES ON SOME DEVON PLANTS.

By the Rev. E. S. Marshall, M.A., F.L.S.

Last autumn I had two short days' botanising near Braunton, v.c. **4** N. Devon, and also did some collecting about Cofton and Dawlish Warren, v.c. **3** S. Devon. It may be worth while to mention the more interesting results; such as I believe to be new vicecomital records are starred. Three gatherings made by Mr. Hiern are included.

Fumaria Borœi Jord., forma *rubens* Pugsley (var. *verna* Pugsley, *prius*, non Clavaud). **3**. Sandy field, west of Cofton. I found this at Dawlish in 1886.

Epilobium obscurum* × *parviflorum*. **3. Near Cofton, with the parents; a good intermediate.

Oenothera ——. **4**. The Evening Primrose established on Braunton Burrows (Saunton end) seems to be identical with the Berrow, N. Somerset, plant determined by Dr. Focke as his *O. ammophila*. I saw a few specimens, apparently identical, in a sandy clover-field, west of (**3**) Cofton.

Lithospermum officinale L. **4**. A broad-leaved form was observed at Saunton; but it differs from var. *pseudo-latifolium* C. E. Salmon in the shape and clothing of the foliage.

Euphrasia nemorosa H. Mart. **3**. Near Cofton.—**E. occidentalis* Wettst. **4**. Locally frequent on the edge of Braunton Burrows, close to Saunton.—*E. curta* Wettst., var. *glabrescens* Wettst. **4**. Plentiful on Braunton Burrows; sometimes unusually floriferous.

Bartsia viscosa L. **3**. Abundant in marshy ground, west of Cofton; often much larger than I had seen it elsewhere—up to 40 inches high. The numerous small red-brown seeds look like cayenne pepper.

Salicornia dolichostachya Moss. **3**. Frequent on sandy mud-flats, Dawlish Warren; it was first observed there in 1911 by Mr. T. Lea and the Rev. C. F. Benthall, Vicar of Cofton, to which parish the Warren belongs. ***4**. Near the Taw estuary, at "The Strand," Ashford, *W. P. Hiern*, sp. I also saw it in a sandy salt-marsh near Braunton Burrows, where it appeared to cross rather freely with *S. herbacea* L., forma *patula* Moss (*S. patula* Duval-Jouve).—*S. ramosissima* Woods. ***3**. Frequent and variable about Cofton and Dawlish Warren; slender states grow freely on the drier flats, at a considerable distance from the sea. Dr. Moss tells me that a peculiar plant (No. 4215), which I suspected might be new, is so named by Dr. E. J. Salisbury; with the proviso that some of the specimens may be hybrids of that and *S. gracillima* (not observed there, but perhaps overlooked). ***4**. Near the Taw estuary, close to Braunton Burrows.—**S. gracillima* Moss. **4**. By the Taw estuary, Ashford, *W. P. Hiern*, sp. Agrees very well with my original gathering from Pagham, W. Sussex; new for the county.—*S. Smithiana* Moss (*S. prostrata* Pallas, var. *smithiana* Moss & Salisbury). **3**. Local on sandy mud-flats, Dawlish Warren. **4**. Salt-marshes near the Taw estuary, adjoining Braunton Burrows.—*S. disarticulata* Moss (type). ***3**. Dawlish Warren, over a very restricted area. ***4**. By the Taw estuary, Ashford, *W. P. Hiern*, sp.

Polygonum maritimum L. **3**. Still grows near Dawlish, whence Mr. W. F. Miller recorded it in 1885; last year it was very scarce and small. Remarkably fine at Teignmouth, *E. W. Hunnybun*, sp.

Euphorbia exigua L. **4**. Probably a true native on Braunton Burrows; remote from cultivation, associated with *Erythræa pulchella* and *Anagallis arvensis*.

CAREX BASILARIS *Jordan*.

By H. Stuart Thompson, F.L.S.

In his note on "Spanish and Portuguese Carices" (Journ. Bot. 1907, p. 211) Mr. Druce recorded this little-known sedge from the range of Tibidabo, north of Barcelona, and said that "Kükenthal puts it as a variety of the Portuguese *C. depressa*

Link"; he "also met with it, in 1904, near Costobelle, Alpes Maritimes." This Departmental name was obviously a slip for that of the Var, Costebelle being a hilly pine-clad district south of Hyères, visited by Mr. Druce, where are several good hotels.

Whatever *C. basilaris* of Jordan may be, and doubtless Kükenthal is right, some of the French botanists reduce it to *C. depressa*, though Rouy makes it a distinct species, and Arcangeli considered it a variety of *C. Halleriana* Asso (Syn. p. 133, 1779). It is recorded from only one station in the Var by Albert and Jahandiez (Cat. des Plantes Vasc. du Var, 1908), and that in the Esterel (*ex* Bull. Soc. bot. France, xxx, p. 152); nor is it reported from les Iles d'Hyères. The habitat given is "bois frais" in the Esterel and near Menton, etc., in Alpes Marit. (Ardoino, Rouy and others); and according to Bicknell (*Flora of Bordighera*) it is "rare under the chestnuts between the Ceriana and Taggia valleys" in Liguria. Therefore *C. basilaris* is not a plant I should expect to see about Costebelle, whereas the closely allied and very similar *C. Halleriana* Asso (*C. gynobasis* Vill.) is frequent in those regions among the pinewoods on arid, stony ground, as it is throughout the South; and Mr. Bucknall has shown me specimens from Costebelle itself.

To add to the confusion, Mons. Burnat did not include *C. basilaris* in his list of 64 Carices found in les Alpes Maritimes, including the range of mountains known by that name, which he showed me in October, 1907. It would be interesting if Mr. Druce could confirm his Costebelle record of this rare and little understood plant—a record evidently overlooked in France. It seems to differ from *C. Halleriana* chiefly in the long cuspidate glume of the fruiting spikelet, in which respect it resembles the allied *C. ambigua* Link.

Rouy points out that in addition to *C. Halleriana* two other species usually have "pédoncules basilaires," viz. *C. depressa* Link and *C. basilaris* Jordan; and that some dozen other Carices have "accidentellement pédoncules ± gynobasiques." In *C. basilaris* the glumes in the male spikelet are *lanceolate, acute;* the female spikelets are 15–20-flowered, ellipsoid, and the glumes *obovate, markedly cuspidate;* the fruit feebly trigonous, 3–3½ mm. long. In *C. Halleriana* the lower glumes in the male spikelet are *obtuse;* the female spikelets are ovoid or subglobular, loose, and *few-flowered* (2–10 in our specimens), and the glumes are *shorter* than the utricle, elliptic, acuminate, whitish at the border in the upper half and on the keel; the fruit is clearly trigonous, 4–5 mm. long, strongly nerved, and fawn-coloured.

According to Rouy (*Flore de France*, xiii, p. 441, 1912), *C. depressa* is found only in the Pyrenees and Portugal; and *C. basilaris* occurs in les Alpes Maritimes, the Var (Col du Lentisque in the Esterel), Corsica, near Bonifacio, southern Spain (Mr. Druce's record from Catalonia is overlooked), Liguria, Morocco, and Algeria. *C. Halleriana* has a much wider range in Europe, western Asia, Africa, and N. America.

* Burnat [illegible] 45 [illegible]

BIBLIOGRAPHICAL NOTES.

LXIV.—"FLORA OF PRINCE OF WALES'S ISLAND."

In the Department of Botany is preserved a folio manuscript entitled "Outline of a Flora of Prince of Wales's Island" (Penang), dedicated to "His Excellency the Most Noble Marquis Wellesley, Governor General," by Dr. William Hunter (1755–1812), and dated from "Calcutta, 18th May, 1803." The provenance of the MS. is not known—it was not one of those from Banks's library—but its interest led to the publication of a transcription in the *Journal of the Straits Branch of the Royal Asiatic Society* (No. liii, 52–127) in 1909, with an Introduction by Mr. H. N. Ridley, at that time Director of the Botanic Gardens, Singapore. A perusal of this Introduction, in which the special value and interest of the Flora are shown, suggests one or two corrections which may as well be placed on record: a note on the nomenclature of one of the species is added.

Mr. Ridley describes the MS. as by "*Sir* William Hunter," who is also styled "the author of this manuscript," which he says is "in the British Museum." Hunter was never knighted, and, although he was the author of the Flora, the MS. itself, with the exception of the signed dedication (the date of which—"Calcutta, 18th May, 1803"—is omitted from the printed copy), is not in his hand. Moreover the MS., although in one sense "in the British Museum," is, as has been already stated, in the Department of Botany at South Kensington.

The account of Hunter's life in the *Dictionary of National Biography* (xxviii, 305) makes no reference to his visit to Penang, which took place in 1802.* As the introduction and list show, he made a full investigation of the island and of its plants, paying special attention to those of economic value, of which he wrote a full account. From this were drawn two papers—on *Nauclea* (*Uncaria*) *Gambier* and on species of *Piper*—which he published as independent essays. Mr. Ridley says that the former (printed in Linn. Trans. ix, 218, and read before the Linnean Society in 1807) must have been written "about the same time" as the MS.; it is, however, almost textually derived from it, as are the descriptions which follow of other species of *Nauclea*.

It may here be noted that the original MS. was accompanied by drawings to the number of twenty-two, to which references are made in the margin of the MS. copy which are omitted from the printed version: these are doubtless with the original MS., should that be in existence. The plate which accompanies the paper in Linn. Trans. is not, as might be inferred from Hunter's remark in the printed copy and MS., one of these to which the expanded flowers alone were added from a drawing transmitted by Berry to Roxburgh: Hunter's note (Linn. Trans. ix, 223) makes it clear that the Roxburgh drawing was the original of that plate—of this we have in the Department of Botany a beautiful coloured copy from the collection of Indian drawings formed by Dr. John Fleming (t. 1815) acquired in 1882, to which reference was made in this Journal for 1906, p. 238. On the preceding page is printed a letter from Hunter concerning Hardwick's drawings. The paper is reprinted, without plate, in *Nicholson's Journal*, xxii, 336 (1809).

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* *Asiatick Researches*, ix, 389 n.

The second paper, dealing mainly with the cultivation of pepper (*Piper nigrum*), published in *Asiatick Researches*, ix, 383–93 (1807) is also, as Mr. Ridley says, " very much the same " as the account in the MS.; it is indeed practically identical with it, save for an introductory note and synonymy. But it contains descriptions of four other species, one of which presents matter of some botanical interest. This is named " *P. Latifolium* ? " and is very briefly characterised, the sign of doubt being explained by Hunter in a note :—" Having seen only a small specimen without fructification, which I know merely by description, I cannot speak with certainty of this species." In a subsequent communication, printed as an " Appendix " to vol. xi (1810), Hunter says that he sent live specimens of this to Roxburgh, who, when they flowered, found them to represent an undescribed species which he named *P. sarmentosum*, sending Hunter a description which the latter published (*l. c.*). This description, so far as I can ascertain, has been entirely overlooked ; the Kew Index refers for *P. sarmentosum* Rotb. to *Hort. Benghalensis* 4 (1814 : nomen) and Roxb. Fl. Ind. (ed. Carey) i. 160 [162], (1820). In Fl. Brit. Ind. v, 83, Sir Joseph Hooker shows that the name has been variously applied ; he makes no reference to Roxburgh in connection with it, but cites Wallich's List 6641 as " perhaps the true plant," adding that " he [Wallich] is the authority for referring Hunter's *P. latifolium* to it "—a statement which consultation of the List does not support. *P. sarmentosum* Roxb. is retained as a species by C. De Candolle (Prodr. xvi, 1, 352) and in the Kew Index, where, however, *P. latifolium* Hunter, on which it was founded, is referred to *P. longum*. Hooker, as has been shown, takes no cognizance of Roxburgh's plant ; Mr. Ridley's reference of Hunter's plant to *P. longum* is of course based on the reference in Fl. Br. Ind. already cited. If the species be maintained as distinct the proper reference for it is

PIPER SARMENTOSUM Roxb. ex Hunter in Asiat. Res. xi. 565 (1810).

The transcript from which the Flora was printed was carefully done, but in certain matters of minor interest it will be desirable to refer to the original for the purposes of accurate quotation. The substitution of " Ayer Hitam " for " Ayer Etam " may doubtless be justified on the ground of accuracy, but the student of vernacular names must not trust implicitly to the transcription of these—*e. g.* the name for " *Amonum globosum* ? ", printed " Boonga Chungkenam," stands in the MS. as " Boonga Ghung Kenám." It would perhaps have been better had the editorial notes and identifications been placed in accordance with usual practice in [ ] instead of in ( ), and it may be regretted that Mr. Ridley did not add an index. JAMES BRITTEN.

SHORT NOTES.

Two Insect Fungi.—When walking over Blackdown-on-Mendip early in February I saw a brilliant orange club-shaped fungus forcing its way through the heather. This turned out to be *Cordiceps militaris* Fr., a parasite on the pupa of a moth. It is met with in England at intervals, but has not been recorded from N. Somerset since 1877, when Mr. Cedric Bucknall found it in the conidia stage in the Leigh Woods, Bristol. In the first week of April, when gathering violets in a thicket at Compton Dando, near Pensford, I found another species, *C. entomorrhiza*, springing from the dead larva of the common Ghost Swift moth (*Hepialus lupulinus* L.). This fungus is much less conspicuous, as the egg-shaped sporangium is very small and of a dull yellow colour. It is a new record for the vice-county and appears to be rare, although the larva has a wide distribution.—Ida M. Roper.

Carex rariflora.—In this Journal for 1913, p. 167, Messrs. Marshall and Shoolbred say of *Carex rariflora* : " Locally plentiful in spongy bogs near the Allt a'Chama Choire (2600 to 2800 feet). The only other known Perthshire station is on Meall Odhar, close to Clunlichan Glen and just within the same vice-county." It may be worth while putting on record that I gathered the species on Ben Lawers in August, 1899. On the same excursion I also gathered *Juncus castaneus*, which is, I believe, rare or unknown on that mountain.—L. Cumming.

Crocus vernus in Essex.—To the *Garden* for March 25th Miss E. Willmott contributes an article on " The Crocus Fields at Warley " (near Brentwood), which is accompanied by an illustration from a photograph showing masses of the plant in a " woodland " there. The Crocus is not mentioned in Gibson's *Flora of Essex*, but Miss Willmott says it is known to have been growing at Warley " for very many years: I have traced it as far back as 1620 or 1630, but I have not come across any record of its having been planted." The fact that it had not previously been recorded is doubtless because of its growth in private grounds, where it can hardly be regarded as having any claim to nativity; but its occurrence was evidently well known locally, for Miss Willmott writes that " an event of the year was a visit to Warley Place when the Crocus was in flower: many a farmer would lend his waggon for the day to convey a happy little party of mothers and their children to see the purple fields."

Battarrea phalloides in Britain (p. 105).—In addition to the localities given for this fungus by Mr. J. Ramsbottom there is another, viz. Wickham, near Croydon, in the late Dr. C. B. Plowright's " List of Norfolk Fungi " (Norf. & Norw. Nat. Trans. 1872-73, p. 45). The figure which accompanies the list is said to be depicted from one of the specimens found in 1872 by Cecil H. S. Perceval, Esq., " outside and inside a decayed ash tree in the grounds of the Earl of Egmont at Epsom."—W. A. Nicholson.

REVIEWS.

The Pliocene Floras of the Dutch-Prussian Border. Mededeelingen van de Rijksopsporing van Delfstoffen, no. 6. By Clement Reid, F.R.S., and Eleanor N. Reid, B.Sc. 's-Gravenhage, 1915.

It has long been known that during the earlier part of the Tertiary period the vegetation of Britain included many genera of Flowering plants and Gymnosperms and some Ferns that have since migrated to more southern regions, and are now unknown in Europe; the inference is that thoughout the greater part of the Tertiary era the climate of Britain was at least as warm as that of the South of France or the Island of Madeira at the present day. Fruits and seeds from the Cromer Forest-bed of Upper Pliocene age, a deposit formed towards the end of the Tertiary period, afford clear evidence of climatic conditions very similar to those of to-day, and point to a gradual lowering of temperature which reached its maximum in the succeeding Glacial period. The occurrence of Arctic and sub-Arctic plants and animals in beds associated with glacial deposits bears testimony to a southern migration from northern Europe; this was checked by the return of more genial post-glacial conditions and, as the temperature rose, the plants ascended the hills or saved themselves by a return to higher latitudes. No one has contributed to our knowledge of the later stages in the evolution of the British flora as much as Mr. Clement Reid, and he has been very ably assisted by Mrs. Reid in the difficult and laborious task of preparing the material, often in a fragmentary state, for examination, photographing the specimens, and comparing the fruits and seeds with existing types from all parts of the world. The amount of work involved can only be appreciated by those who have some acquaintance with the nature of the records and realise the very great difficulty of identifying fruits and seeds in the absence of any thoroughly representative collection of recent forms.

We now possess a fairly complete sequence of plants, represented chiefly by fruits and seeds, from British localities ranging from the Pliocene beds of Norfolk to the days of the Roman occupation. In 1908 Mr. and Mrs. Reid published a revised list of plants* from a series of alluvial and estuarine deposits which underlie the boulder clay and stretch for nearly fifty miles along the Norfolk and Suffolk coasts from Sherringham to Pakefield deposited by the Pliocene Rhine, which at that period, "after receiving numerous large tributaries—now separate rivers—seems to have flowed across the present bed of the North Sea. It probably entered the sea somewhere near Cromer." In their concluding remarks the authors summarise the results of their analysis of the flora as follows: "Perhaps the first thing to strike a botanist on examining our list will be how little the flora has altered in the many thousand years that have elapsed and during the various climatic changes that have intervened"; but they add that a closer study of the 147 species reveals the presence of several exotic types. An investigation in 1907 by the same botanists of the Rhine delta-deposits of Pliocene age of Tegelen in Holland* demonstrated the occurrence of plants unrepresented in the slightly younger Cromer beds, which give an Eastern facies to the flora. The volume now before us is chiefly concerned with a still older Pliocene flora obtained from Reuver, Swalmen, and Brunssum in the province of Limburg (Holland), and over the Prussian frontier. The fossiliferous beds form part of the delta-deposits of the Rhine and Maas, extending from the Prussian frontier in the east and to East Anglia in the west. The Reuverian plants were found in sediments laid down in an abandoned channel or backwater, and other species were discovered in beds resting on Miocene strata containing seeds distinct from the overlying Pliocene plants with which we are now concerned. The deposits at Reuver, Swalmen, and Brunssum are probably contemporaneous, and such distinctive features as are shown may be attributed to geographical causes. About 300 species were recognised; 230 species are assigned with "some degree of certainty" to a definite position, and rather more than half the total are determined with "considerable certainty." Experience has shown that fruits and seeds afford in many cases trustworthy guides, and it is almost entirely on their evidence that the authors' conclusions are based. The occurrence of East Asiatic types in the Tegelen flora in some measure prepares us for the striking resemblance exhibited by the Reuverian flora to that of the mountains of West China, as also to the flora of Japan, the Himalayas, and Tibet. There are, moreover, indications of relationship with European floras, and to a less extent with North American floras. In many cases where a Reuverian genus is now represented in Europe and China, it is with the Far Eastern species that the agreement is closest: the fossil species of *Pterocarya*, *P. limburgensis*, is nearer to *P. hupehensis* of China than to *P. caucasica*; *Betula digitata*, an extinct species, is most closely allied to the Chinese species *B. ulmifolia*, belonging to a section of the genus no longer found in Europe; the only *Clematis* in the Reuverian flora is *C. grata*, a Chinese type, and not the British species *C. Vitalba*; the Pliocene *Eupatorium* is allied to *E. japonicum*, and even more closely related to an unnamed variety from a mountain in Japan. The Chinese species most closely related to those of the Reuverian flora do not range as far north as the Pliocene stations, and they are highland and not lowland forms. *Picea excelsa*, *Quercus Robur*, *Carpinus Betulus*, and other species recorded from the Reuverian series, are either still living in Europe or are more nearly allied to European species than to Far Eastern types. Other Pliocene plants, *e.g.* *Zelkowa Keaki*, *Orixa japonica*, *Phellodendron japonicum*, now occur on Japanese mountains; *Helwingia himalayaca*, *Bucklandia*

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* "On the Pre-Glacial Flora of Britain," Journ. Linn. Soc., vol. 37, p. 206, 1908.

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* "The Fossil Flora of Tegelen-sur-Meuse, near Venloo, in the Province of Limburg," Verhand. Kon. Akad. v. Wetensch. (Tweede Setie), Deel xiii, no. 6, 1907.

populnea are Himalayan species; *Liquidambar orientale* occurs on the mountains of Asia Minor; the genera *Sequoia* and *Carya* provide points of contact with the west and east of North America. The evidence on which the conclusions are based is exhibited in twenty well-reproduced plates of slightly enlarged photographs taken by the authors, and the descriptive text is concise and to the point.

The composition of the Reuverian flora suggests three streams of migrants from a northern home: two of these made their way to warmer regions, one by way of America and the other towards eastern Asia; the third stream was less fortunate, most of the migrants being unable to reach a congenial climate along the European route. "Throughout the whole length of Europe and Asia, till the coastal plains of China were reached, the retreat to the south was cut off by one unbroken barrier of seas, deserts, and mountains through which no river opened a way to the south. The want of relationship between the Reuverian flora and the living flora of Europe would seem to imply that, as wave after wave of migration broke against this barrier the species it brought must have perished, cut off by the cold of the north behind and of the mountains in front. It was at this barrier that the connection between the present European and the Chinese floras was destroyed; so that now, except in deposits such as the Reuverian, and in a lesser degree the Teglian, very little trace of it is to be found." The chain of events that led to the present distribution of the representatives of the Pliocene floras of Europe is clearly outlined in the concluding pages of the account of the Reuverian plants. As the authors state, it was probably far back in the Tertiary period that the plants which have left their traces in the Pliocene delta-deposits flourished in polar regions, whence they subsequently spread along divergent lines.

The work of Mr. and Mrs. Reid affords an admirable example of a combination of qualities, thorough systematic analysis and broad philosophical generalisations. Their success should stimulate others to take up the study of older Tertiary floras in western Europe, which, though as yet but imperfectly known, show many remarkable instances of the occurrence of American and Eastern types. In conclusion a brief allusion may be made to a few of the Reuverian species. In naming a new species of *Acer A. striatum,* the authors have inadvertently employed a specific name previously used for an existing member of the genus. One of the most interesting types recorded is that named *Gnetum scandens* var. *robustum*, but the piece of inflorescence-axis on which the identification is founded is hardly convincing. There has been considerable difference of opinion with regard to the presence of Proteaceous plants in Tertiary European floras, and the evidence furnished by detached leaves has generally been regarded as inadequate: it is therefore particularly interesting to find a species of *Hakea* recorded from Brunssum. The type-specimen is a very small follicle, 7 × 4 mm., much smaller than the fruit of existing species, but attention is drawn to the fact that unusually small dimensions characterise several Reuverian seeds and fruits belonging to families no longer found in Europe. Similarly a cone referred to *Sequoia* is about 2 mm. long, though in the form of the cone-scales it bears a close resemblance to the recent species, and the genus is known to have flourished in England in the Oligocene period. A new genus of Anonaceæ named *Jongmansia*, after Dr. W. J. Jongmans, is founded on seeds from Reuver and Swalmen. It is impossible to do justice to the admirable work of Mr. and Mrs. Reid within the limits of a review; it is a model of careful research and an exceptionally important contribution towards the solution of phytogeographical problems.

A. C. SEWARD.

The Principles of Plant-Teratology. By W. C. WORSDELL. 8vo, vol. i, pp. xxiv, 270, with 25 plates and 60 text-figs. London: Ray Society, 1915. Price 25*s*. net.

IN 1869 the Ray Society issued Dr. Maxwell Masters's classic work on *Vegetable Teratology*. The method of arrangement adopted was the obvious one, the author was treating of the various abnormalities occurring in the plant-kingdom and bringing together for the first time a great amount of detailed information, and the type of abnormality therefore provided the basis for the arrangement. Though the amount of knowledge on this subject has increased greatly since Dr. Masters's book appeared, an increase which was due in the first instance largely to his own investigations, his *Vegetable Teratology* continues to be the most ready book of reference, supplemented by Penzig's *Pflanzenteratologie*. Mr. Worsdell strikes a different note. His book "is intended to present the subject in more scientific fashion, and in quite a new form, both as regards the mode of treatment and the large number of additional facts." The arrangement is a morphological one; the subject matter, except in the small section on Fungi, is treated under the headings of the various main organs of the plant, root, stem, leaf, and flower. But the author has a deeper purpose, to wit the study of the phylogenetic (evolutionary) origin of the organs of plants. The chief problem to solve is: from what original organ has this or that structure been derived in the course of evolution, and what are the changes through which it has passed in order to reach its present condition? And the best solution is reached, in Mr. Worsdell's opinion, by means of the teratological method. The study of ontogeny is in some cases a trustworthy guide, the anatomical method is of subsidiary value for determining the morphological nature of an organ, the comparative method is "pre-eminently serviceable," but "surely most important and valuable of all is the teratological method."

The author regards the vitalistic position as the only logical one. Any change which takes place, whether normal or abnormal, is always of the nature of a definite variation which under normal conditions takes the form of a purposeful adaptation. Even in cases where the change is harmful, as in double flowers, a fasciated shoot or a virescent ovule, "there is in a sense a purposive adaptation, for no doubt the plant adapts itself in the best way it can to the abnormal conditions."

The author's own standpoint is emphasised throughout the volume, and the reader must also condone a somewhat aggressive style of writing and a use of the superlative which is more frequent than elegant. But apart from his conclusions bearing on phylogeny or morphology, which may or may not be convincing, Mr. Worsdell has done useful work in bringing together a great mass of facts bearing on plant-abnormalities, arranged primarily under the organ affected. The scattered literature of the subject has been carefully studied, and the author has also investigated a great many cases at first hand. The book is the outcome of many years' work and much deliberation, and will fill a useful place in botanical literature. The first volume comprises an Introduction, in which the author states his case, a section on the non-vascular plants dealing with the comparatively few abnormalities which have been described in the Fungi and Bryophytes, and a much larger section dealing with abnormalities of the Root, Stem or Shoot, and Leaf of the Vascular Plants. There is also a glossary, and selected bibliographies at the end of the various subdivisions. The text-figures are useful, though somewhat crude, and the long series of plates, mainly photographic reproductions of actual specimens, are a helpful addition. The second volume will deal with the Flower. A. B. R.

BOOK-NOTES, NEWS, ETC.

The March number of the *Journal of Genetics* (Cambridge University Press, 10*s.* net) is almost entirely occupied with matter of botanical interest. The largest paper is that by Misses Caroline Pellew and Florence M. Duncan on "The Genetic Behaviour of the Hybrid *Primula Kewensis* and its Allies." The first *Primula kewensis* was found growing among plants of *P. floribunda*, and was thought to be an accidental hybrid of *floribunda* and *verticillata*: after a period of sterility it gave rise to a perfectly fertile form of larger size widely known as a greenhouse plant, and it is to this form that the name *P. kewensis* is generally applied. The paper is illustrated by five beautiful plates, mostly in colour—one of the latter shows some of the shades of yellow not previously known in *kewensis* nor *floribunda*. Miss Edith R. Saunders writes "On the Relation of Half-Hoariness in *Matthiola* to Glabrousness and Full Hoariness"; Messrs. W. Neilson Jones and M. Chevely Rayner on "Mendelian Inheritance in Varietal Crosses of *Bryonia dioica*," with three plates; Messrs. J. Vargas Eyre and G. Smith write on "The Cross Pollination of Flax," which is followed by a note by Mr. Bateson on "Experiments with Flax at the John Innes Horticultural Institution."

The recently issued (March) part of the *Flora of Tropical Africa* (vol. vi, sec. 2, part 1), which is edited by Sir David Prain, is mainly occupied by the *Moraceæ*, which are elaborated by Mr. Hutchinson and Dr. Rendle, the latter having also undertaken the *Ulmaceæ*. The principal genera are *Dorstenia*, of which Dr.

Rendle describes 95 species, and *Ficus*, of which Mr. Henderson enumerates 174, 142 of them described in this part. Turning over the pages, we note what seems an eccentricity in orthography: specific names commemorating persons in the genitive case begin with a capital letter (a practice at one time abandoned by Kew, but afterwards resumed), but its adjectival form with a small one—*e.g. Prantlii* and *kraussiana*. The International Rules recognize no such distinction: "Specific names begin with a small letter except those which are taken from names of persons (substantives or adjectives) . . ."

British Fungi and How to Identify Them, by J. H. Crabtree (Kelly, 1*s*.), is a cheap little book of about 60 pages, having a small note-book fitted in the cover. There is an introduction of four pages, giving an account of the growth of the larger fungi and their structure; this is necessarily very condensed—in some places so much so as to give a wrong impression. The statement "contrary to the habit of plants generally, they [Fungi] gather oxygen from the atmosphere, and after its conversion in their tissues they evolve carbon di-oxide" is startling. Between thirty and forty species are described, with photographs facing the description. The photographs in the majority of cases are excellent, but some (*e.g. Tricholoma personatum*) would not enable a beginner to spot the fungus. The descriptions are usually correct, but naturally do not go very far. On page 32, concerning Blewit (*Tricholoma personatum*), the author writes: "The common names of some fungi are very arbitrary, and have arisen through force of habit or custom." One would say, rather, that most of the "common names" given here are simply due to the imagination of a previous author, who wrote in his preface: "It has never been my privilege, as yet, to meet with any person versed in mycology from whom I could derive instruction"! It is strange to find as the frontispiece of such a book a photograph of "an unnamed fungoid growth found upon a tree," when the object is almost certainly *Phoradendron* or some other genus of Loranthaceæ.—J. R.

At the meeting of the Linnean Society on March 16th, Mr. C. C. Lacaita read a paper entitled, "Plants collected in Sikkim, including the Kalimpong District, April 8th to May 9th, 1913." He gave an account of his circular journey from Darjiling to his starting point, part of it with the party of H.E. the Governor of Bengal. The monotony of the forest region was mentioned, and the marvellous abundance of the Aroids. An account of a new *Rhododendron* and some critical remarks on the species of *Fragaria* closed the introduction, and some lantern-slides of the scenery and people were exhibited.

At the meeting of the same Society on April 6th, Dr. O. Stapf showed a series of maps and lantern-slides explaining the presence of the southern elements of the British flora. He referred to H. C. Watson's terms, "British, English, Atlantic, Germanic," etc., proposed in 1835, and employed in his *Cybele* in 1847;

the term "Atlantic" defined by him "as having reference only to distribution within Britain" was unfortunate as confining the conception to the British flora as a detached item from the Continental flora. The year before the first volume of Watson's *Cybele* appeared, Edward Forbes issued his remarkable address on types of distribution, undoubtedly inspired by Watson's preliminary essay, but he had a wider grasp of the subject, and basing his remarks upon geological causes, divided the native plants into five groups. The group least represented occurs in the mountains of the west and south-west of Ireland, allied to species found in the north of Spain; he specified twelve, but reduced to the modern concept of species, they are the following nine: *Saxifraga Geum*, *S. umbrosa*, *S. hypnoides*, *Erica Mackaiana*, *E. mediterranea*, *Daboëcia polifolia*, *Arbutus Unedo*, *Pinguicula grandiflora*, and *Arabis ciliata*. He further referred to others found in the Channel Islands. The first group he termed "Asturian," the second "Gallican" types. He showed that the derivation was due to a former land-connection, unsubmerged during the Glacial Epoch. Engler held that the reimmigration of the Atlantic element took place in post-glacial times, and Dr. Scharff dealt incidentally with it in his chapter on the Lusitanian fauna published in 1899. We hope shortly to have the opportunity of presenting our readers with Dr. Stapf's interesting paper in full.

The useful handbook *Flora of the Upper Gangetic Plain*, by Mr. J. F. Duthie, which we have from time to time had occasion to notice, has now a companion in the *Flora of the Presidency of Madras*, by Mr. J. S. Gamble (Adlard). It is proposed to issue this in parts of 192 pages each, of which we have received the first instalment (which contains 200). The arrangement of Bentham and Hooker is followed: the enumeration is here brought down to *Aquifoliaceæ*. Each genus is described, with a clavis to the species and an indication of the geographical distribution and of the uses, when any. A general introduction, with a key to the families, will be issued when the work is complete. The price, as contrasted with that of Mr. Duthie's book, seems excessive—8*s*. net for 200 pages as against 3*s*. for 266 somewhat smaller: the latter, however, is printed at Calcutta.

At the present time a note by Correa de Serra (1750–1823) published in his "Notice respecting several Vegetables used as Esculents in North America" (Trans. Hort. Soc. iv, 443, 1822) may be worth reproducing: "The *Capsella bursa pastoris* . . . is an esculent plant in Philadelphia, brought to market in large quantities in the early season. The taste, when boiled, approaches that of the Cabbage, but is softer and milder. This plant varies wonderfully in size and succulence of leaves, according to the nature and state of the soil where it grows. Those from the gardens and highly cultivated spots near Philadelphia come to a size and succulence of leaf scarcely to be believed without seeing them. They may be easily bleached by the common method, and certainly in that state would be a valuable addition to the list of delicate culinary vegetables."

INDEX TO CURTIS'S 'FLORA LONDINENSIS' 1775–98
WITH HOOKER'S CONTINUATION, 1817–28.

By B. Daydon Jackson, Ph.D., Sec. L.S.

The following index to the *Flora Londinensis* was drawn up in the first instance, for my own use, and the added synonyms were meant for my readier access to the plates.

Much information has been published with regard to the issue of this noble work, as may be seen in earlier volumes of this Journal—vol. xix. (1881) 309–310; xxxiii. (1895) 112–114; xxxvii. (1899), 390–395, the last being a detailed list, so far as was then discoverable, of the sequence of the plates as issued, to the end of the fifth fasciculus, with suggestions as to the last fasciculus gleaned from Withering's *Arrangement* 1796, and Sibthorp's *Flora Oxoniensis* 1794. In the possession of the Linnean Society is a small octavo manuscript by Dr. Richard Pulteney, drawn up in or about the year 1794, styled, 'A Catalogue of some of the more rare plants found in the neighbourhood of Leicester, Loughborough, and in Charley Forest,' which quotes Curtis throughout, and cites the following numbers in the sixth fasciculus:—62. *Stellaria uliginosa.* 63. *Hydrocotyle vulgaris.* 64. *Lathyrus sylvestris*, and *Ornithopus perpusillus.* 65. *Melissa Nepeta.* The *Lathyrus* and *Ornithopus* cannot both be cited as numbered, but both are dated 1791, and one may have been issued earlier than Pulteney's citation warrants, a clear indication for caution in following such clues.

The names given in the Curtisian Index may be found in Pritzel's *Iconum Index*, but the trouble is to find the plates in the book. Pritzel seems to have specially numbered the copy he used, and quoted these numbers, consequently no one can find his references without a long search. Similar rearrangement was effected by other librarians, which I shall refer to later.

I have followed the practice of Sir J. E. Smith, by referring to fasciculus and number, but in a shortened citation, the fasciculus being denoted by Roman numerals, as to a volume, and the plates by Arabic figures. Seventy-two or 73 formed a fasciculus which was closed by a triple list: (1) A catalogue of the plants figured in the Linnean order: (2) an alphabetical list of the Latin names, and (3) a similar list of English names. A few corrections were silently made in these lists, as where *Typha major* and *T. minor* of the plates became *T. latifolia* and *T. angustifolia* of the index. The author's intention was to form two volumes, for a general summary was given at the end of the third fasciculus, and apparently only two title-pages were issued, that for the first volume dated 1771, and that for the second volume dated 1798, when the work was closed, but many possessors seem to have bound their copies in three volumes, two fasciculi in each.

The second edition consisted of the original plates, with text rewritten in great part by William Jackson Hooker, who occasionally added H. to an entirely new paragraph. As regards the original Curtisian figures; these formed three volumes, with title pages and four indexes to each: I. arranged in Linnean sequence, II. in a "Natural Method," III. alphabetic; and IV. by English names in alphabetic sequence. At the same time as this new edition of Curtis was brought out, a continuation was in progress. Sir Joseph Hooker says: "This magnificent work taxed my father's time and artistic skill for ten years. Owing to incredible mismanagement on the part of the Editor [George Graves] it never took the position in botanical literature which the excellence of the descriptions and the beauty of the plates merited. The main cause of this was that (as in the case of the first edition) the plates not being numbered or referred to in the letter-press, which itself was not paged, citation was impossible. Furthermore, the title of the second edition was a misnomer; that of the first was 'Flora Londinensis, or Plates and Descriptions of such Plants as grow wild in the Environs of London'; that of the second is 'Flora Londinensis, containing a History of the Plants indigenous to Great Britain.' Neither edition has either Preface or Introduction, and the plates of the first bear no artist's signature; they are no doubt by William Curtis himself, whose name on the title-page of the work is a guarantee for their truth and beauty. The accompanying descriptions are meagre. In the new edition the plates of vols. i–iii (443) [*i.e.* 434] "are reprints from the coppers used in the first, and are of plants found in the environs of London; those of vols. iv and v are of plants very few indeed of which are indigenous anywhere near London. Of these . . . most, if not all, of them are from drawings by my father. . . . The descriptions throughout the five volumes were, except those of the [five] plates signed R. K. Greville, I believe, all written, enlarged, or rewritten by my father; but his name appears nowhere except on the title-pages of vols. iv and v, on which are inserted the words 'The Botanical descriptions arranged and corrected by W. J. Hooker,' words which apply to the preceding four volumes. . . . To conclude, this rare and beautiful work was produced at great cost under financial embarrassment of the Editor (Mr. Graves), and its end is probably unique in the history of botanical works,—Chancery! under which I may add that the real author could hardly have been a beneficiary."—Ann. Bot. xvi. (1902) pp. xcviii–xcix.

The foregoing extract needs correction. The name of William Kilburn, "artist and calico-printer," appears on many plates throughout the Curtisian portion. Thus, to take the first fasciculus only, we find on twenty-four plates the legend, "Kilburn pinxt. et sculpt.," one with "Kilburn pinxt.," six with his name, and two with his initial "K" only. These names are mostly in drypoint, and thus apt to be worn off the plate in the course of printing. Later artists were F. Sansom and Sydenham Teast Edwards, both as draughtsmen and as engravers. Then, too, the inscriptions on the title-pages of the Hookerian volumes run thus: "The descriptions by William Jackson Hooker," and not as cited above.

The fine copies at Kew and the Botanical Department, British Museum, Cromwell Road, have been specially arranged, the former as regards vol. iv in the order of De Candolle's edition of Lamarck's *Flore Française*, and vol. v. in the sequence of Hooker's *Flora Scotica;* the latter in the Candollean sequence from Ranunculaceæ to Fungi. The copy in the Linnean Society's library has the original Curtisian issue only, the six fasciculi being placed by the binder according to the scheme in the Linnean order at the end of each fasciculus, and the number printed there, copied on the back of each plate by Smith himself. The Hookerian portion has been arranged, as far as possible, in the order of issue; plates 1–43 inclusive were not numbered, but the accompanying leaves of text had small numbers at the foot of the text, and these have served for arranging the plates from 1–43; from 43 [bis] onwards, the plates were numbered, and the numbers on the text have been disregarded, as they hopelessly differed in the majority of cases from the plates they explained; thus out of the entire 216 plates, the text was wrong in 146 cases out of 174 which can be collated—nearly seven out of eight. Besides this the following 8 numbers are wanting: 34, 47, 73, 108, 118, 169, 173, 179; but equalising these, we find the following 8 employed in duplicate: 43, 44, 70, 105, 120, 159, 171, and 176. The total number of plates I make out to be 650; six fasciculi of 72 plates, and 2 extra plates, amount to 434, and 216 in the Hookerian volumes. Pritzel's figures in his *Thesaurus* (702) and *Index Iconum* (645) are at variance with each other and the figures cited above.

The dates on the title-pages of the second edition run thus:

Vol. i, 1817; Vol. ii, 1821; Vol. iii, 1826;
Vol. iv, pt. I, 1819; — pt. II, 1821; Vol. v ,1828.

A reissue of the complete work was made by Mr. H. G. Bohn in 1835, which differed only by the imprint and date on the title-pages.

I have shown the plates in the two later volumes by prefixing the initial H. Roman and Arabic figures point to the first six fasciculi, and names in small capitals represent modern synonyms of the names on the original plates. Some of the names altered in the second edition are thus accounted for, and a few remaining are quoted through Pritzel's *Index Iconum, e.g. Moenchia glauca*, when the name on the original plate is *Sagina erecta.*

ACERAS ANTHROPOPHORA, cf. vi, 66
Achillea Millefolium, vi, 61
    Ptarmica, v, 60
ACTINOCARPUS DAMASONIUM, ed. 2 (fide Pritzel), cf. v, 28
Adonis autumnalis, ii, 37
Adoxa Moschatellina, ii, 26
Æthusa Cynapium, i, 18
Agaricus æruginosus, v, 70
    aurantius, v, 69
    carnosus, v, 71
    fimetarius, ii, 73
    floccosus, iv, 71
    glutinosus, iii, 69
    hybridus, H. 10
    ostreatus, iii, 71
    ovatus, ii, 72

Agaricus plicatilis, iii, 70
  procerus, iv, 69
  velutipes, iv, 70
  verrucosus, v, 72
Agrimonia Eupatoria, v, 32
Agrostemma Githago, iii, 27
Agrostis setacea, vi, 12
Aira aquatica, i, 5
  caryophyllea, vi, 6
  præcox, iii, 7
Ajuga reptans, ii, 43
ALARIA ESCULENTA, cf. H. 84
Alchemilla vulgaris, H. 210
Alisma Damasonium, v, 28
  Plantago, v, 27
  ranunculoides, H. 27
Alnus glutinosa, H. 59
Alopecurus AGRESTIS, ed. 2 (fide Pritzel), cf. ii, 7
  geniculatus, v, 6
  pratensis, v, 5
  myosuroides, ii, 7
Alsine media, i, 20
AMANITA PHALLOIDES, cf. v, 72, dextr.
  RUBESCENS, cf. v, 72, sinistr. et med.
AMMOPHILA ARENARIA, cf. H. 181
Anagallis arvensis, i, 12
  cærulea, H. 159
  tenella, iii, 15
Anchusa sempervirens, H. 94
Anemone apennina, vi, 35
  nemorosa, ii, 38
  Pulsatilla, H. 44
Anthemis Cotula, v, 61
Anthoxanthum odoratum, i, 4
ANTHISCUS VULGARIS, cf. i, 19
Antirrhinum Cymbalaria, i, 45
  Elatine, i, 46
  Linaria, i, 47
    var. Peloria, vi, 41
  minus, v, 41
  Orontium, iv, 45
  Peloria, vi, 41
  spurium, iii, 37
APARGIA HISPIDA, ed. 2 (fide Pritzel), cf. v, 56
Arabis PERFOLIATA, cf. iv, 47
  stricta, H [4]
  Thaliana, ii, 49
Arabis Turrita, H. 176 [bis]
Arctium Lappa, iv, 55
Arenaria rubella, H. 203
  serpyllifolia, iv, 32
  trinervia, iv, 31
Aristolochia Clematitis, H. 149
ARMILLARIA AURANTIACA, cf. v, 69
ARNOSERIS PUSILLA, cf. H. 65
ARRHENATHERUM ELATIUS, cf. iii, 6
Arum maculata, ii, 63
Arundo arenaria, H. 181
Asperula odorata, iv, 15
Aspidium cristatum, H. 113
  Filix-mas, H. 40
Asplenium marinum, H. 60
  Scolopendrium, i, 67
  septentrionale, H. 162
  Trichomanes, H. 156
Aster Tripolium, H. 196
Atriplex hastata, ii, 66
  PATULA, ed. 2 (fide Pritzel), cf. ii, 66
Atropa Belladonna, v, 16
Avena elatior, iii, 6
  flavescens, iii, 5

Bartramia pomiformis, H. 15
Bartsia alpina, H. 87
  ODONTITES, cf. i, 44
  viscosa, H. 167
Bellis perennis, i, 62
Betonica officinalis, iii, 33
Bidens cernua, iii, 55
  tripartita, iv, 57
BLECHNUM BOREALE, ed. 2 (fide Pritzel), cf. ii, 67
  SPICANT, cf. ii, 67
Boletus hepaticus, H. 126
  imbricatus, H. [16]
  lucidus, iv, 72
  squamosus, H. 6
  sulphureus, H. 132
Botrychium Lunaria, H. 66
BRACHYTHECIUM PURUM, cf. iii, 65
Brassica ALBA, cf. v, 46
  monensis, H. 205
  muralis, iii, 38
  NIGRA, cf. v, 47

- Brassica SINAPISTRUM, cf. v, 47
- Bromus ASPER, cf. ii, 8
  - diandrus, vi, 5
  - giganteus, v, 7
  - hirsutus, ii, 8
  - MATRITENSIS, cf. vi, 5
  - mollis, i, 8
  - sterilis, i, 9
- Bryum argenteum, iii, 67
  - barbatum, iv, 65
  - cespititium, iii, 67
  - hornum, i, 71
  - ligulatum, H. 3
  - scoparium, i, 69
  - subulatum, iii, 66
  - truncatulum, ii, 70
  - undulatum, i, 70
  - viridulum, ii, 71
- Bunium Bulbocastanum, iv, 24
- Butomus umbellatus, i, 29
- Buxbaumia aphylla, H. 23, fig. infer.

- Cakile maritima, H. 160
- CALAMINTHA ACINOS, cf. i, 43
  - NEPETA, cf. vi, 40
- Callitriche aquatica, H. 127
- Calluna vulgaris, v, 30
- Caltha palustris, i, 40
- CALYSTEGIA SEPIUM, cf. i, 13
- CALLUNA VULGARIS, cf. v, 30
- Camelina sativa, H. 70
- Campanula glomerata, H. 146
  - hederacea, H. 93
  - patula, H. 51
  - Ranunculus, H. 80
  - rotundifolia, iv, 21
  - Trachelium, H. 109
- CAMPTOTHECIUM SERICEUM, cf. ii, 69
- CAPSELLA BURSA-PASTORIS, cf. i, 50
- Cardamine amara, iii, 39
  - hirsuta, iv, 48
  - pratensis, iii, 40
  - SYLVATICA, cf. iv, 48
- Carduus ACANTHOIDES, cf. vi, 54
  - arvensis, vi, 57
  - Marianus, iii, 54
  - palustris, vi, 56
- Carduus polyacanthos, vi, 54
  - tenuiflorus, vi, 55
- Carex acuta, iv, 61
  - ACUTA, cf. iv, 62
  - DEPAUPERATA, cf. vi, 68
  - gracilis, iv, 62
  - pallescens, H. 178
  - PALUDOSA, cf. iv, 61
  - pendula, iii, 63
  - præcox, H. 22
  - pulicaris, H. 177
  - riparia, iv, 60
  - ventricosa, vi, 68
- CATABROSA AQUATICA, cf. i, 5
- CATHARINEA UNDULATA, cf. i, 70; cf. H. 3
- Caucalis Anthriscus, vi, 22
  - infesta, vi, 23
- Centaurea Cyanus, vi, 62
- Centunculus minimus, iii, 11
- CEPHALANTHERA PALLENS, cf. H. 76
  - ENSIFOLIA, cf. H. 77
- Cerastium aquaticum, i, 34
  - arvense, vi, 29
  - GLOMERATUM, cf. ii, 35
  - pumilum, vi, 30
  - QUATERNELLUM, cf. ii, 12
  - semidecandrum, ii, 33
  - tetrandrum, vi, 31
  - TRIVIALE, cf. ii, 34
  - umbellatum, H. 13
  - viscosum, ii, 35
  - vulgatum, ii, 34
- Chærophyllum sylvestre, iv, 25
  - temulum, vi, 24
- Cheiranthus Cheiri, H. 147
- Chenopodium album, ii, 15
  - Bonus Henricus, iii, 17
  - FICIFOLIUM, ed. 2 (fide Pritzel), cf. ii, 16
  - hybridum, iv, 23
  - murale, vi, 20
  - olidum, v, 20
  - polyspermum, ii, 17
  - rubrum, vi, 21
  - viride, ii, 16
  - VULVARIA, cf. v, 20
- Chironia Centaurium, iv, 22
- Chlora perfoliata, H. 2
- Chorda Filum, H. 204

Chrysanthemum Leucanthemum, v, 62
    segetum, vi, 60
Chrysosplenium oppositifolium, ii, 27
Cichorium Intybus, iv, 56
Cinclidotus fontinaloides, H. 11
Cineraria campestris, H. 75
Circæa lutetiana, iii, 3
Cistus guttatus, vi, 33
    Helianthemum, v, 36
    marifolius, H. 171
Clematis Vitalba, iv, 37
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    CRISPUS var. cf. vi, 54
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    PALUSTRIS, cf. vi, 56
    PYCNOCEPHALUS var. cf. vi, 55
Cochlearia officinalis, H. 148
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CONOPODIUM DENUDATUM, cf. iv, 24
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    Polygonatum, H. [38]
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    sepium, i, 13
COPRINUS ATRAMENTARIUS, cf. ii, 72
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    PLICATILIS, cf. iii, 70
Corallorrhiza innata, H. 142
Cornus suecica, H. 194
Corylus Avellana, H. 17
Cotoneaster vulgaris, H. 209
Cotyledon Umbilicus, H. 184
Crepis tectorum, v, 55
    VIRENS, cf. v, 55
Cuscuta europæa, H. 67
Cynoglossum officinale, iv, 16
Cyperus fuscus, H. 85
Cypripedium Calceolus, H. 42
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Daphne Laureola, H. 206
Datura Stramonium, vi, 17
Dianthus Armeria, H. 134
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DICRANUM SCOPARIUM, cf. i, 69
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DILSEA EDULIS, cf. H. 72, sup.
Diotis maritima, H. 137
DIPHYSCIUM FOLIOSUM, H. 23, sup.
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    sylvestris, iii, 9
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Draba muralis, H. 64
    verna, i, 49
Drosera longifolia, H. 183
    rotundifolia, H. 189
DRYOPTERIS CRISTATA, cf. H. 113
    FILIX-MAS, cf. H. 40

Epilobium alpinum, H. 170
    angustifolium, ii, 24
    hirsutum, ii, 21
    montanum, iii, 24
    PARVIFLORUM, cf. ii, 22
    tetragonum, ii, 23
    villosum, ii, 22
Epipactis ensifolia, H. 77
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    pallens, H. 76
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    vaginatum, iv, 10
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Ervum hirsutum, i, 54
    tetraspermum, i, 55
Eryngium maritimum, H. 185
Erysimum Alliaria, ii, 48
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FILAGO GERMANICA, cf. H. 43
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    esculentus, H. 84
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    officinalis, ii, 52
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    hibernica, H. 37, sup.
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Galeobdolon Galeopsis, iv, 40
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    uliginosum, H. 21
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Gentiana Amarella, H. 33
Geranium cicutarium, i, 51
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    lucidum, H. 32
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    pratense, iv, 49
    PUSILLUM, ed. 2 (fide Pritzel), cf. vi, 46
    pyrenaicum, iii, 42
    Robertianum, i, 52
    rotundifolium, H. 216
    sanguineum, H. 155
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Glaucium corniculatum, vi, 32
    FLAVUM, cf. vi, 32
    luteum, H. 56
Glaux maritima, H. 188
Glechoma hederacea, ii, 44
GLYCERIA FLUITANS, cf. i, 7
    PROCUMBENS, cf. vi, 11
Gnaphalium germanicum, H. 43
Goodyera repens, H. 144
Grimmia ovata, H. 28, inf.
    pulvinata, H. 28, sup.
Gymnadenia conopsea, H. 186

Habenaria albida, H. 107
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    viridis, H. 130
HEBELOMA FLOCCOSA, cf. iv, 71
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Hedera Helix, i, 16
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    VINEALE, cf. H. 171
    VULGARE, cf. v, 36
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Herminium Monorchis, H. 138
Hieracium Halleri, H. 215
    Pilosella, iv, 54
    umbellatum, vi, 58
Hippuris vulgaris, iv, 1
Holcus lanatus, iv, 11
    mollis, v, 8
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Hordeum maritimum, H. 43
    murinum, v, 9; H. 43, inf.
Hottonia palustris, i, 11
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Hyacinthus non-scriptus, ii, 18
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    IMBRICATUM cf. H. 16
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Hymenophyllum tunbridgense, H. 71
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    hirsutum, iii, 49
    humifusum, iii, 50
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  TETRAPTERUM, cf. iv, 52
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  proliferum, i, 72
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Juncus arcticus, H. 152
  campestris, ii, 19
  pilosus, v, 25
  sylvaticus, v, 26
Jungermannia complanata, iv, 68

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  GALEOBDOLON, cf. iv, 40
  purpureum, i, 42
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  pusilla, H. 65
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  FILIX-MAS, cf. H. 40
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Leontodon Taraxacum, i, 58
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Ligustrum vulgare, v, 1
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  ELATINE, cf. i, 46
  MINOR, cf. v, 41
  SPURIA, cf. iii, 37
  VULGARIS, cf. i, 47
    var. PELORIA, cf. vi, 41
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Linum catharticum, iii, 19
  usitatissimum, v, 22
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  Nidus-avis, H. 58
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  lupulina, ii, 57
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  - nutans, vi, 4
  - uniflora, v, 10
- Melissa Nepeta, vi, 40
- Melittis Melissophyllum, vi, 39
- Mentha hirsuta, H. 166
- Menyanthes trifoliata, iv, 17
- Mercurialis annua, v, 68
  - perennis, ii, 65
- MERTENSIA MARITIMA, cf. vi, 18
- Meum athamanticum, H. 182
- Milium effusum, iv, 12
- MNIUM HORNUM, cf. i, 71
  - UNDULATUM, cf. i, 70
- MOENCHIA ERECTA, cf. ii, 12
  - GLAUCA, ed. 2 (fide Pritzel) = præc.
- MOLINIA CÆRULEA, cf. v, 11
- MONESES GRANDIFLORA, cf. H. 207
- Monotropa Hypopithys, H. 105
- Montia fontana, iii, 8
- MUTINUS CANINUS, cf. iii, 73
- Myosotis alpestris, H. 145
  - PALUSTRIS, cf. iii, 13
  - scorpioides, iii, 13
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- Nardus stricta, H, 175
- Narthecium ossifragum, H. 139
- NASTURTIUM OFFICINALE, cf. vii, 44
  - PALUSTRE, cf. v, 49
  - SYLVESTRE, cf. iii, 41
  - TERRESTRE, ed. 2 (fide Pritzel), cf. v, 49
- NEOTTIA NIDUS-AVIS, cf. H. 58
- NEPETA HEDERACEA, cf. ii, 44
- Nuphar lutea, H. 141
  - Kalmiana, H. 165, fig. 12.
  - pumila, H. 165
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- Œnanthe crocata, H. 201.
- Ophioglossum vulgatum, H. 78
- Ophrys anthropophora, vi, 66
  - apifera, i, 66
  - ARANIFERA, cf. vi, 67
  - fucifera, vi, 67
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  - fusca, vi, 64
  - hircina, H. 96
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  - PURPUREA, cf. vi, 64
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NOTES ON PLANTS FROM SKYE.

By C. E. Salmon, F.L.S.

My friend Mr. A. Wallis paid another visit * to this attractive island in 1915; the following notes are the outcome of overhauling his bundle of specimens and noting his remarks upon the various species observed.

The most interesting feature of the list is the record of a new *Armeria*, upon which some observations appear below; notes also will be found upon *Heleocharis uniglumis* and its relation to *H. palustris*.

I am indebted to the Rev. E. S. Marshall, Mr. Clement Reid and Mr. Arthur Bennett for help in various directions. Plants distinguished by an asterisk are supposed new records for v.c. 104.

Ranunculus acris L. Quirang! Except for being rather more hairy, this agrees very closely with a *Ranunculus* I gathered in Glen Suleag (Westerness) in 1902, which Mr. Townsend determined as *R. rectus* Bor.

Trollius europæus L. Portree; Quirang.

Papaver Rhæas L. One plant, cultivated ground, Broadford. "Probably the merest casual."—A. W.

**Fumaria officinalis* L. Garden ground, Sligachan.

**Cochlearia grœnlandica* L. Dun an Aird, Sligachan!

Polygala serpyllacea Weihe var. **vincoides* Chodat. Cil Chriosd! An interesting discovery.

Cerastium tetrandrum Curt. Beach, Brittle.

Spergularia salina Presl. var. *neglecta* Syme. Muddy shore, Snizat!

S. marginata Kittel. Sligachan Loch!

Hypericum Androsæmum L. Coast from Sligachan Loch to Portree, on cliffs; ravine N. side of Loch Sligachan.

Trifolium medium L. About Uig.

Vicia sylvatica L. Cliffs at Brittle.

Rubus villicaulis Koehl. Cliffs, Brittle! The Rev. W. M. Rogers reports as follows: "This is exactly what Focke considers Koehler's type of his *R. villicaulis*, one of the most constant and generally distributed of Scottish brambles. See Journ. Bot. 1897, 45, 46. I have seen a Skye specimen of Druce's and one from Eigg (S. M. Macvicar)."

R. Selmeri Lindeb. Cil Chriosd! (fide W. M. R.)

Dryas octopetala L. Extremely abundant on limestone about Ben Suardal, near Broadford.

**Potentilla Fragariastrum* Ehrh. Brittle cliffs; not common.

Rosa tomentosa Sm. Uig!

Circæa lutetiana L. Nowhere seen wild in the island. Garden hedge, Sligachan, in ground which was moor twenty years ago.

C. alpina L. Cliffs, Brittle; limestone pavement, Cil Chriosd, Broadford.

Ligusticum scoticum L. Cliffs, Dun an Aird, Sligachan.

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* See Journ. Bot. 1910, p. 225.

Asperula odorata L. Gorge of Greta, Glen Brittle.

Eupatorium cannabinum L. Cliffs, Brittle.

Aster Tripolium L. Only seen at Portree Loch.

Carlina vulgaris L. One place near Brittle and there rare.

**Sonchus arvensis* L. First observed in 1909 on the beach at Glen Brittle; at Suizort it takes the place of *Chrysanthemum segetum* in fields.

**Armeria sibirica* Turcz.? Mr. Wallis gathered an interesting Thrift upon the Coolins, at an elevation of about 2500 ft., which I submitted, with other Thrifts, to Mr. G. C. Druce, who has studied the genus. He kindly examined the specimens and remarked upon the Skye example, "I am inclined to think it is *planifolia*," with the note, "this has abruptly truncated bracts and open mouth to calyx tube," and suggested that it should go to Mr. Clement Reid for his opinion.

Accordingly I sent the parcel of Armerias to Mr. Reid, who has carefully examined and reported at some length upon them, prefacing his remarks with the observation: "Your Thrifts are most interesting, for they yield the first clear evidence that I have come across of the existence of a third well-defined species in Britain." As regards the plant from the Coolins, he says: "Mr. Druce is quite right that this has the features specified, but these two characters are found in *sibirica* as well as in *planifolia*. The general appearance of the plant, the very narrow leaves, the tall slender scape and the shape of the outer bracts suggest *sibirica*." In a later letter Mr. Reid tells me that as just now it is not easy to obtain true *sibirica* Turcz. from Petrograd for comparison, he thinks that, for the present, this Skye plant—and the same remark applies, Mr. Reid considers, to a striking *Armeria* my brother and I gathered on Slioch, Ross-shire, in 1896—should be diagnosed as a "peculiar small-tufted narrow-leaved *Armeria*, with tall slender scapes, closely resembling the Scandinavian alpine plants referred to *A. sibirica* and perhaps identical with the true *A. sibirica* of Siberia. It is unlike either *A. maritima* or *A. planifolia*, having a regularly campanulate (not constricted) calyx like the latter species, though the calyx is much smaller. Further Siberian material is needed before we can be certain of the identity of our plant with the true *A. sibirica*."

Gentiana campestris L. Quirang!

Myosotis cespitosa Schultz. Uig and Sligachan!

**Calystegia sepium* Br. Waste ground, Portree; also seen in hedges near cultivated land at Sligachan and Broadford. "Not unfrequent in cottage gardens. This plant in Skye has about as much claim to being considered truly wild as *Vinca major* has in the South of England."—A. W.

**Euphrasia nemorosa* H. Mart. Sligachan!

**E. scottica* Wettst. Sligachan!

**E. curta* Wettst. Portree! First observed in 1909.

**Rhinanthus borealis* Druce. Coolins, at 2000 ft.!

Melampyrum pratense L. var. *montanum* Johnst. Bogs, Sligachan!

Utricularia ochroleuca Hartm. Peaty edges of Loch Cil Chriosd!

Scutellaria minor Huds. River bed, Sligachan.

S. galericulata L. Beach at Dun an Aird, Sligachan.

Stachys palustris × *sylvatica.* Portree and Sligachan.

Plantago lanceolata L. var. **sphærostachya* Röhl. Loch Sligachan!

Atriplex laciniata L. Shore, Brittle!

Suæda maritima Dum. Very scarce, from Dun an Aird to shores of Loch Sligachan.

Polygonum amphibium L. var. *terrestre* Leers. Cultivated land and stream-side, Brittle.

Rumex domesticus Hartm. Abundant at high-water mark from mouth of Sligachan Loch to Dun an Aird.

Salix caprea L. Dun an Aird, near Sligachan!

S. cinerea L. Cliffs, Brittle!

S. alba L. Near Portree in a wild situation; probably spread thence from cultivation (see Journ. Bot., 1884, p. 368).

**Epipactis ovalis* Bab. Limestone pavement, Ben Suardal, near Broadford, very scarce!

Juncus trifidus L. Corrie Greta.

Potamogeton heterophyllus Schreb. Loch Lonachan!

**Ruppia rostellata* Koch. Abundant in a shallow pool, Dun an Aird, near Sligachan!

Heleocharis uniglumis Link. Stony shores of Loch Lonachan! Mr. Wallis also sent specimens, in ripe fruit, from Uig, where it was reported some years ago by the Messrs. Linton (see Journ. Bot., 1884, 368).

H. palustris and *H. uniglumis* are doubtless closely allied, indeed, they are considered as synonymous by C. B. Clarke (Journ. Bot., 1887, 267), who also remarks (B. E. C. Rep., 1897, 570) that *uniglumis* "is diagnosed as differing by the lowest bract sheathing the culm nearly (or quite) all the way round at base; an indefinite character that cannot be worked." Hence, I was much puzzled by some of the Skye examples having the outer glumes not by any means encircling the spike, although the fruit seemed correct for *uniglumis.* This caused me to make a closer examination of the two plants, with the following results.

It appears that whilst in *H. uniglumis* the lowest glume usually practically completely encircles the spike (as is well shown in specimens from Castlegregory, S. Kerry, gathered in 1902 by the Rev. E. S. Marshall, and others from Little Sea, Dorset, collected by Mr. Pugsley in 1913), yet occasionally, as in these Skye examples, it encloses barely three-quarters of the circle. Mr. Townsend noted this point in Fl. Hants., 645 (1904), when describing some living plants from Redbridge.

On the other hand, in *H. palustris* the glume encloses about half the circumference of the spike, rarely more, and never completely encircles it. Apparently, too, the membranous margin of the glumes is not so pronounced in *uniglumis* as in *palustris*, and the colour, in the former, seems of a richer chocolate-brown.

But it was in the ripe fruit where the chief distinction seemed to lie. In *uniglumis* it was approximately 1¾ mm. long, irrespective of the persistent usually broader-than-long style-base, whilst the fruit of *palustris* measured scarcely 1½ mm. and its style-base was usually longer than broad. This indicates approximately that the fruits of *uniglumis* minus the style-base equal those of *palustris* plus this appendage.

As regards the sculpturing of the fruit (to which Townsend (*l. c.*) strangely omits reference) it appears that in *uniglumis* the surface is distinctly punctate-striate, appearing (under a 1 inch power) beautifully marked with cell-like depressions in regular series; but it is not so in *palustris*, the fruit of which is normally almost smooth but occasionally slightly punctate-striate. In the latter case the depressions are fainter than in *uniglumis*, are not in such regular formation nor of the same shape. The colour of the fruit is more or less brown in *uniglumis*, but in *palustris* is of a decidedly yellowish tint.

I have compared the Skye plants with *Scirpus* (*Heleocharis*) *mamillatus* Lindb. fil., of which I have an example collected by the author, but they cannot be placed under that. It seems to hold a middle position between *H. palustris* and *H. uniglumis*, having, amongst other characters, the glume character and sculpture of fruit of the former, with the style-base of the latter. It certainly should occur in these islands.

To sum up, it appears that *H. uniglumis* may satisfactorily be separated from *H. palustris* irrespective of the encircling outer-glume character, by its larger, browner fruit with broader style-base and the more obvious punctate-striations on its surface.

These observations are made with the hope that others may confirm them with the help of further material.

H. multicaulis Sm. Bogs, Sligachan!

Scirpus pauciflorus Lightf. Shores of Loch Sligachan!

S. cæspitosus L. Corrie Lagan, Coolins, at 2000 ft.!

S. maritimus L. Harport.

S. rufus Schrad. Portree Loch!; Suizat; Dun an Aird.

Carex sp. Mr. Wallis sent two culms of a most interesting Sedge from Loch Sligachan that matches extremely well the Westerness plant determined by Prof. Kükenthal as "*C. Goodenowii* × *stricta* (= *turfosa* Fries)," and reported in Journ. Bot., 1906, p. 226. *C. stricta* is not reported from the West coast of Scotland further north than Dumbarton (Ewing) but on the Eastern side it reaches Aberdeenshire.

C. fulva Host. Ben Suardal!

**C. extensa* Good. Edges of muddy tidal ditches, Portree Loch!

C. Œderi Retz. var. *œdocarpa* And. Portree!

C. flava L. Near Broadford! The typical form, which is evidently very much scarcer than *lepidocarpa*.

Alopecurus pratensis L. Cil Chriosd Churchyard.

Deschampsia cæspitosa Beauv. var. **brevifolia* Parn. Coolins, at 2500 ft.!

Molinia cærulea Moench. var. **viridiflora* Lej. Shady glen near Broadford!

Poa nemoralis L. Cliffs, Quirang!

P. alpina L. Corrie Lagan, Coolins, at 2500 ft.! The more frequent viviparous state.

**Festuca bromoides* L. Roadside between Kyleakin and Broadford!

**Bromus giganteus* L. Cil Chriosd Churchyard.

**B. ramosus* Huds. Portree.

**Agropyron caninum* Beauv. On the limestone at Cil Chriosd, near Broadford.

Elymus arenarius L. Dun an Aird, only a few plants.

Hymenophyllum unilaterale Bory. Gorge on Ben Lee, Sligachan.

Asplenium marinum L. Cliffs, Brittle and Dun an Aird.

A. viride Huds. Cracks in limestone pavement, Ben Suardal, near Broadford.

Osmunda regalis L. Brittle, rare.

Chara fragilis Desv. subsp. *delicatula* Braun. Pool, Glen, Sligachan, and also on mud deposited by calcareous stream, edge of Loch Lonachan under Ben Suardal! Both gatherings determined by Mr. H. Groves.

PLANTS OF W. SUTHERLAND AND CAITHNESS.

By the Rev. E. S. Marshall, M.A., F.L.S.

Mr. F. J. Hanbury and I did some collecting, last summer, during the second half of July and early August, chiefly near Melvich. Few novelties were observed, as these coasts had already been worked a good deal by ourselves and others; but it may be worth while to mention the more interesting observations. So far as we know, the starred records are vice-comital additions.

Viola canina 'L.', Hayne (*ericetorum* Schrad.). 108. Very small, probably starved specimens were seen in barren, stony ground near Strathy Point.

V. Lloydii Jord., var. **insignis* Drabble. Dr. Eric Drabble thus names the handsome, large-flowered pansy so plentiful in fields about Melvich (108), Wick (109), and many other places on the north coast. It appears, however, to be also native; we noticed it about Strathy and Altnaharra, in places well away from cultivation.

* *V. derelicta* Jord. 108. Frequent in outfields at Melvich, often as an unusually large-flowered form. Confirmed by Dr. Drabble.

Cerastium tetrandrum Curt. 108. A peculiar form or variety, small, erect, with the stem-leaves often large and broadly-ovate; occurs in crevices among the rocks at Strathy Point; I have seen nothing to match it elsewhere.

Anthyllis Vulneraria L., var. **ovata* Bab. 108. Coast rocks, west of Melvich; very scarce.

Vicia sylvatica L. 108. Armadale Burn, in small quantity.

Rosa mollis Sm., var. **cærulea* Woods. 108. Melvich; small bushes, about three feet high. Fruit mostly naked, but occasionally with a few bristles.

× *R. involuta* Sm., * var. 108. Several handsome bushes, up to five feet, grow by the Armadale Burn. Flowers two inches across, pale pink. Sepals long and narrow, nearly simple, very glandular. Fruit bristly, becoming subglobose. Petioles glabrous, but glandular. Leaflets glabrous above, hairy on the midrib beneath, with some scattered glands; teeth mostly compound, gland-tipped. Stems with many acicles and stalked glands; primary prickles slender, usually straight, sometimes two-thirds of an inch in length. I suspect that it is a hybrid between *R. spinosissima* L. and *R. suberecta* Ley.

Parnassia palustris L., var. *condensata* Wheldon & Travis. 108. * Melvich. 109. Dunnet Links.

Matricaria inodora L., var. *phæocephala* Ruprecht. 108, 109. In profusion on the cliffs, about Melvich and Strathy, and east of Reay.

Artemisia vulgaris L., var. *coarctata* Forselles. 108. Very characteristic at Melvich, on field-borders.

Hieracium anglicum Fr., var. *longibracteatum* F. J. Hanb. 108. Rocks above Farr Kirk (Betty Hill).

H. caledonicum F. J. Hanb. 108. Sandy coast slopes, Strathy.

H. argenteum Fr., var. *septentrionale* F. J. Hanb. 108. Sparingly on rocks, west of the River Naver, opposite Betty Hill. A modification, due to the unusual habitat, was seen on sandhills at the mouth of the Strathy Water; the normal form occurs on the cliffs.

H. euprepes F. J. Hanb. 108. Sandhills, Strathy; not quite typical, but passed by Rev. E. F. Linton.

H. reticulatum Lindeberg, var. **amplidentatum* F. J. Hanb. 108. By the Strathy Water; below the bridge; only a few roots.

H. maritimum F. J. Hanb. This may be extinct in its only known station, at Melvich; but the long drought, lasting from April to July, caused a great reduction in the flowering of the Hawkweeds.

**Euphrasia Rostkoviana* × *scottica*, n. hybr. 108. With the parents, by Loch Mor, Betty Hill. Usually nearest to *scottica* in habit; but with larger leaves and flowers; glandular hairs shorter and fewer than in *Rostkoviana*.

**E. brevipila* × *latifolia*, n. hybr. 108. Grassy cliffs, Melvich; only seen at one spot, where the parents were associated. It has the copious whitish-grey pubescence of *latifolia;* but the habit is intermediate, the leaves are more sharply toothed (not crenate), and the upper bracts are thinly clad with short-stalked glands: whereas *latifolia* appears, in that neighbourhood, to be always eglandular. Among the long grass *E. latifolia* often becomes remarkably fine, and sometimes has the flowers bluish, instead of the usual white. It is plentiful near Strathy Point.

E. borealis Towns. 109. A strong, large-flowered form occurs plentifully by the roadside, four miles west of Thurso. Small states abound on Dunnet Links.

E. gracilis Fr. 108. Barren heaths at Melvich and Strathy; but it seems to be rather scarce in the district.

E. curta Wettst. 108, 109. Broad-leaved coast-forms, closely resembling the original plant of Fries, and superficially approaching *E. latifolia*, are locally plentiful near Melvich, and east of Reay.

Bartsia Odontites Huds., var. * *litoralis* Reichb. 109. By small ponds, at Lower Dounreay, east of Reay, and four miles west of Thurso; passed by Mr. Arthur Bennett, but not extreme.

Rhinanthus monticola Jord. 108. Locally plentiful on high, heathery ground, east of Strathy; flowers of a peculiar treacly brown, as in my Glen Doll plant determined by Sterneck.

R. ——. On the grassy cliffs at Melvich we found a Yellow-rattle, evidently near *R. stenophyllus*, but perhaps distinct; the flowers were pale yellow, and the seeds have a rather broad wing.

Melampyrum pratense L., var. * *hians* Druce. 108. Boggy moorlands, south of Melvich.

Lamium molucellifolium Fr. (*intermedium* Fr.). 108. In the Hotel kitchen-garden at Melvich this is luxuriant, associated with *L. purpureum* L.; intermediates (probably hybrids) are not uncommon there. Mr. Bennett writes:—"Neuman, in *Sveriges Flora* (1901), p. 173, considers that *intermedium* Fr. is *L. purpureum* × *amplexicaule*." If so, the apparent absence of *amplexicaule* from places where *intermedium* (a fully fertile plant) abounds is hard to account for.

Plantago major L., var. * *intermedia* Syme (non *P. intermedia* Gilib.). 108. To this I refer a small form, with hairy leaves and scapes, found sparingly in damp, stony ground, south of Strathy Point.

P. Coronopus L. 108, 109. On cliffs, west of Melvich, and in plenty at Dunnet Bay, we found a biennial plant, having leaves mostly broad, acutely toothed, and both foliage and scapes densely covered with white, spreading hairs, which may be var. *latifolia* DC., as defined by Williams, Prodromus Fl. Brit., p. 366.

Euphorbia Cyparissias L. 108. To this must, I believe, be referred a small Spurge, found growing (one good patch) in sandy, submaritime soil near Farr Bay. It was almost prostrate, with crowded, very narrow, glaucous leaves, like young larch-shoots. Probably a recent escape, as we had not met with it on several previous visits. Bracts red.

Betula pubescens Ehrh., var. *microphylla* E. S. Marshall. 108. A birch-wood of considerable extent, above the Armadale Burn, appears to consist mainly, if not entirely, of this.

Carex incurva Lightf., var. * *erecta* Lange. 109. Extremely scarce among rocks just above high-water mark, east of Reay.

C. disticha Huds. 109. With darker glumes than usual;

abundant in a marsh at Lower Dounreay, and near the Isault Burn, Reay.

* *C. aquatilis* × *Goodenowii.* 108. By the Mudal Water, Altnaharra; sterile, and just intermediate.

C. capillaris L., var. *major* Blytt. 108. Mr. Bennett so names luxuriant specimens (up to fifteen inches high) from wet coast slopes, Armadale Bay. We formerly collected it at Betty Hill, and at Ardskinid Point, near Tongue. Apart from the size, I can detect no good varietal character.

C. extensa Good., var. *pumila* And. 109. Scarce on the shore, east of Reay, associated with *C. Oederi* Retz.; but they do not appear to produce hybrids.

Phalaris arundinacea L., var. *picta* L. 109. Marsh at Lower Dounreay, with the type, in great abundance.

Agrostis alba L., var. * *maritima* Meyer. 108. Rocks at Bighouse Cove, near Melvich.

Arrhenatherum precatorium Dietrich (*A. elatius* Mert. & Koch, var. *bulbosum* Presl.). 108, 109. Melvich; Lower Dounreay. Probably not uncommon, but easily overlooked.

Chara vulgaris L. 109. A very pretty deep-water form, of a clear, light green, not incrusted, grows in the fountain at Thurso Castle; Mr. J. Groves gives it no special name.

* *C. hispida* L. 109. A small fresh-water pool on the coast, east of Reay, is full of a light-brown, flexible, hardly fetid state. Named by Mr. Groves.

HYDRILLA VERTICILLATA IN BRITAIN.

By G. Claridge Druce, M.A.

One of the most interesting additions made to the British Flora in recent years is that of the above-named aquatic, which was discovered in 1914 by Mr. W. H. Pearsall in Esthwaite Water, Lake Lancashire (see Journ. Bot. 1914, 257 t. 534), in which locality he kindly showed it me last August, and in which, from its abundance, it cannot have been recently introduced.

Hydrilla has also spread (assuming that it is adventitious) into Australia, where it is rapidly increasing; it also occurs in Africa, and is said to be found in various modifications in the lake systems of Lithuania, Pomerania, and Russia. Nyman, however (Consp. Fl. Europ. Suppl. ii, 285, 1890), says: "Patria hujus plantæ est Indiæ Orient ubi frequens dicitur (sed planta rossica dubia est ex Ledeb.)."

The Lancashire plant does not agree with var. *Roxburghii* Caspary—the common Indian form—but closely resembles the Pomeranian plant (*Udora pomeranica* Reichb., Ic. Fl. Germ. vii, 31) which Caspary names and describes as *H. dentata* var. *pomeranica* (Bot. Zeit. xii, 56, 1854; xiv, 901, 1856); he prefers to use the name *gracilis* instead of *pomeranica* which he had formerly used on account of its being a place-name, and for this reason also replaces *lithuanica* by *crispa*. As this does not seem a valid reason for displacing the original name, I used the name *H. verticillata* var. *pomeranica* (Reichb.) in Rep. Bot. Soc. and Exch. Club, 1914, 22, 1915.

In recently examining the Du Bois Herbarium at Oxford my attention was attracted to a specimen labelled "A. *Stellaria aquatica fol. longissimus* . . . from Mr. Stonestreet." Rev. W. Stonestreet, of St. Stephen's, Walbrook, who died in 1716, was a correspondent of Petiver, Plukenet, and Buddle. His large collection, mostly British and for the greater part without localities, came into the possession of Charles Du Bois, of Mitcham, and passed into the possession of the East India Company, of which body he was treasurer, by whom it was eventually presented to Oxford.

The point of interest in this specimen lies in the chance of its being English. In its favour is the prefixed letter "A" (Anglia), which Stonestreet used to designate his English specimens, and that the plant is not identical with the common Indian variety *Roxburghii*. Against this is the fact that it is also not the same form as the Esthwaite plant, nor indeed quite like the Lithuanian form, and it has evident flowers which I think have not been found on the European specimens. Stonestreet may have obtained his plant from Petiver or Plukenet, who had correspondents in India, but the fact of its being represented in an herbarium of so early a date (circa 1700) is itself of distinct interest.

AN OVERLOOKED IRISH BOTANIST.

By James Britten, F.L.S.

The revision of our *Biographical Index of British and Irish Botanists* has resulted in the exclusion from the material for the second edition of a considerable number of names which, on more thorough investigation than was formerly extended to them, appear to be scarcely entitled to a place therein. The exclusion has been conducted in no narrow spirit: the principles which have actuated it will be fully set forth in the introduction to the second edition, and there is therefore no need to discuss them here.

Among those whose claims were called in question was Andrew Caldwell (1733–1808), a Dublin barrister of whom a brief account is given in Dict. Nat. Biogr. viii. 247. In this there is nothing to show that he was interested in botany or, indeed, in anything save his profession; and although the note in our *Index* indicated that he was a correspondent of Sir J. E. Smith and a Fellow of the Linnean Society, these would hardly justify his insertion in our new edition. On looking up the reference to Smith's Letters, however, it was evident that Caldwell was well acquainted with Irish botany, and the obituary notice in Gent. Mag. lxxviii. 746 (which gives the year of his death as 1732) says that his library was "particularly rich in botany." As I find no reference to him in any of the books which deal with the Irish flora, and as Smith's *Memoir and Correspondence* is not generally accessible, it may be worth while to summarize the botanical information which Caldwell's letters afford. These, with "a few other Letters relative to Ireland," occupy Chapter IX, pp. 123–166 of vol. ii of the work. They do not however represent the whole of the letters which have been preserved; many others are in Smith's Correspondence at the Linnean Society, and I have drawn upon these as well as on the published material. In the course of my investigations I have found that the letters as printed do not always exactly accord with the originals: there are omissions, and in at least one instance—that on p. 133, dated Ap. 5, 1796—two letters are combined.

In his introductory remarks, Smith says that he "had first the pleasure of being made acquainted with [Caldwell] in the year 1799"; but this can hardly have been the case, as Caldwell, writing to Smith Nov. 17, 1795, refers to "the landscape you showed me in the neighbourhood of Norwich." In 1799, however, he again stayed with Smith, and was to have paid a further visit in 1804, but was prevented from doing so. The two men seem to have been sincerely attached to one another; Smith pays a high tribute to Caldwell's character and accomplishments, describing him as "of the mildest aspect and highly polished manners: a tinge of melancholy cast a shade over his dignified deportment, which at once engaged the affections on his side, and broke every barrier of formality and reserve."

It does not appear that Caldwell, who, having been for five years at the Temple, returned to Dublin and was called to the bar in 1760, distinguished himself in his profession, though he held the post of Solicitor to the Customs in that city. "Inheriting a sufficient estate, he made little effort to succeed in the profession of law, devoting most of his time to the cultivation of his literary and artistic tastes,"* and at his residence in Rutland Square brought together a considerable library and a fine collection of prints and drawings.

The first of the printed letters is dated Sept. 13, 1793, but in the Smith Correspondence are two of the preceding year. In the first of these (13 April) he thanks Smith for books, and says "I am but a beginner in Botany, though very fond of plants." In the second (16 June) he regrets that botany "makes no progress" in Dublin: "the only person tolerably informed on the subject is Dr. Wade; he is now giving a course of lectures, but meets with little encouragement. He has had many difficulties to struggle through, having had no opportunity of instruction or support in this place, and is therefore entirely self-taught." He talks of a projected garden; in the next letter (13 Sept.) he informs Smith that "a garden for indigenous botany, under the patronage of the

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* Dict. Nat. Biogr. *l. c.*

Dublin Society, is a measure determined upon." This was the Glasnevin Garden, "which was established by the Dublin Society in 1795 and after the steady growth of more than a century has become, what it now is, a just subject of pride to the inhabitants of Dublin."* This letter shows that Caldwell, notwithstanding his disclaimer, had already attained some proficiency as a botanist and was well acquainted with what is required in descriptive botany—a fact which makes his tribute to *English Botany* more than an empty compliment.

In 1794 Caldwell was in England and had stayed three weeks in Derbyshire, at Matlock and Buxton, neither of which pleased him : "the curious machinery and manufactures" of the former were "detestable" to him ; of the latter he says "a more disagreeable country can scarcely be seen : you cannot get a pleasant ride or walk without going five or six miles in search of it, and the company and amusement of the place does not suit me." He notes that "this county (Dublin) does not afford either numerous or interesting plants : *Smyrnium Olusatrum* is very common." He expresses much regret at not having seen Smith in London : in the following year he visited him at Norwich early in July, greatly to the pleasure of both. The account of his return journey to London, somewhat abridged, seems sufficiently interesting for quotation : it forms the chief part of an unpublished letter dated 28 July, 1795 :

"The Mail Coach is a cheap, convenient manner of travelling, but it is very fatigueing, we were punctually in Town at seven in the morning . . . I find I dont possess the power of sleeping in a coach, so when it became dark, and my companions fast [asleep], I enjoy'd the recollection of my amiable friends at Norwich, of whose continual kindness I shall ever retain a pleasing and grateful remembrance. It was dark before we reach'd Newmarket, and the night misty. I could only perceive this part of the road led over vast extended Heaths, the favorite *Verbascum*, I could not help observing, gradually took its leave, and disappear'd entirely sometime before Day declin'd : the Corn everywhere look'd well, the *C. Cyanus*, *C. Intybus*, and *Echium* in profusion at the road sides, the beautiful blue colours attracted even the notice of my servant . . . The sun rose in the utmost splendour just before we came to what I believe was Epping Forest, the Landscape was wild and enchanting, enough for the warmest fancy of the Poet and Painter, yet their pleasure was lost to every one but me : not a door or Window in any House but was clos'd, and the Inhabitants asleep : how continually we give up the most delightful Hours ! yet sensible of this as I am, I shall persevere in Error, following the example that is always surrounding me. An opportunity was soon afforded of perfect contrast ; the sky became clouded before eleven, and heavy showers were repeated the whole day afterwards : what a change from the brilliant light and the beautifull objects of the Forrest to the gloom and confinement of streets and houses!" . . .

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* Colgan, *Flora of the County Dublin* (1904), p. xxv. Caldwell's letter gives additional information regarding the "lengthy negotiations" which preceded the establishment of the Garden.

In his next letter (17 Nov., 1795) Caldwell notes that Wade, with whom he was on terms of intimacy, "last summer had the ardour to make a stolen visit to the Giant's Causeway to search for the *Scilla verna*, having met in a manuscript in an old book that it grew there. He found it in abundance and brought away some roots."

On April 5, 1796, Caldwell gracefully congratulates Smith on his engagement. It may be noted that the interest of the letters is by no means confined to their botanical portion; those relating to the Irish political history of the disturbed period of the passing of the Act of Union (both published and unpublished) are worth reading by those interested in such matters. Caldwell appears to have been but a lukewarm supporter of the Act: he writes on 25 Dec., 1798: "The project for a Union occasions much agitation here; the majority are strongly against it, but the country appears totally indifferent as yet, and to take no part . . . 'Better, perhaps, to bear the ills we have, than fly to others that we know not of.'" In an unpublished letter (25 Mar., 1801) he says: "Our faithfull representatives have given a terrifick account of the state of this country in late debates: we on the spot feel no alarm and see nothing but tranquillity."

The letters following that of April, 1796, contain references to the Garden, but not much of interest.

On Jan. 6, 1797, Caldwell gives an account of his proceedings during the preceding year. He stayed with Lord Clanbrassil at Tullymore Park (near Newcastle, Co. Down) and notes that "his lordship has naturalized *Antirrhinum Cymbalaria*: it seems to grow spontaneously on bridges and rocks." He went to Scotland—"to Glasgow, to review early scenes of happiness in college days"—and noted "a profusion of *Parnassia*, larger and more luxuriant than I had ever seen it in England or Ireland: *Campanula rotundifolia* covers the fields, but no *Echium* or *Verbascum*: *Rhodiola rosea* is found on one side of Port Patrick, but I took the wrong side and missed it." Attached to the original of this letter (all of which is not printed) is a specimen of *Hymenophyllum tunbrigense*.

In 1798 Caldwell visited North Wales, leaving Dublin by the Holyhead packet on September 5th. He first visited Conway, "too late for much botany," and then went to Aber, where Hugh Davies (1739–1821) was rector. At the inn, where he was staying, he heard of Davies and wrote to him: "he came directly, and in two hours you would have thought we had been acquainted all our lives—such is the liberality and advantage of science." Davies's "kindness and attention were such" that Caldwell stayed six days at Aber, on each of which he was in Davies's company. "All over that part of Anglesea is the greatest abundance of *Lychnis flore rubro*, which I remark because scarcely to be found here [Dublin], though the coasts are opposite, and the soil similar in all appearance. It seems difficult to account for the predilections of place." At the time of writing—his letter is dated "Christus natus est 1798"—he had just made the acquaintance of Templeton (1766–1825), who was "in town for a few days: he is an alert, active botanist; knows everything at sight. We went together to a friend's about ten miles off at the sea-side; it came on a storm, and so tremendous a surf it was impossible to walk on the beach. He picked up a *Chlora perfoliata* withered, but with ripe seed; it don't grow in this country; it seemed as much joy as a good prize in the lottery." This letter is not printed in full: the postscript contains this critical note:—"The pocket Synopsis by Symons I am not pleas'd with—I have too much respect for Linneus to admit of the frequent innovations. It is most absurd that a book for the pocket should be on heavy thick paper. I begin to dislike mightily your wove papers and hot press. After your Flora comes out, a right portable pocket companion would be a prodigious convenience and comfort. Both Mr. Davies and I condemn this Symons, but we found it of use for want of a better." The suggestion here conveyed was carried out by Smith by the publication of his *Compendium* in 1800.

In 1799 Caldwell again visited Smith at Norwich and made the acquaintance of Mrs. Smith, with whom he afterwards corresponded. Writing to Smith on August 30th of this year, he refers pleasantly to his visit: "With what pleasure I recollect the quiet studious hours in your library! It put me in mind of college days: young men then frequently study together. It is not in everyone's company now, that I can read with attention; but you never were a discomposure, nor I flatter myself was I to you; I was sometimes impelled by curiosity to ask a question, but I believe not too often." This year he botanized at St. Vincent's Rocks, but could not find *Arabis stricta*.

Passing by various letters which contain nothing of special interest, although they testify to Caldwell's increased knowledge of his favourite subject, we come to that of 25 March, 1801. In this he says that his "botanic study has been much interrupted" but is now resumed. "*Flora Britannica* is my constant companion: verbal description can scarcely be conceived more clear or satisfactory; and I fancy, when the spring is more advanced, it will be a delightful guide through the fields." In a subsequent letter (Feb. 3, 1802) he says he had been "obliged to stay in town the whole summer" and that his botany was therefore confined to his garden. "I was, however, part of May at Lord Besborough's in the county of Kilkenny. I found the little specimen inclosed, on rocks, at a place called Owning; it is, I think, the *Myosotis* β the [*M. versicolor*]: the flowers were yellow, singularly curled like a crosier. The leaves are hirsute as well as in α, but the blossom really yellow. The crosier form is perhaps accidental. The *Rubus Idæus* was also there."

It is interesting to note that *Orchis latifolia* was, in those days as later, a puzzle to field botanists; Caldwell's reference to the scent is also interesting—his remarks apply equally to *O. mascula*. "I shall be glad to know," he says, "if you ever observed that the *Orchis latifolia* has, occasionally, a very disagreeable hircine scent. This Orchis is in great plenty about Besborough; but this peculiar scent I do not find taken notice of by any of you botanic writers. The scent is more frequent when the plant is pulled and put into water. It grows then so strong, it is very unpleasant in a room; we were forced to throw them out. I have also perceived it on the ground, but that seldom. The puzzling circumstance is that many of the same Orchises, scattered close about, have no smell. I have examined numbers, to try whether there was any difference to make out a variety;—never could perceive the least. I have watched them for several days, to see whether it was occasioned by the different stage of the growth,—but to no purpose; that seemed not to produce any change. Linnæus says, *bracteis flore longioribus;* that is not the case in any plants I have ever seen, nor in the figure in Miller's Illustr., nor in Curtis. The figure in Curtis is much better drawn and more faithful than in Miller. The latter gives the root palmated; Curtis's and all the real plants I have found have two bulbs. These disagreements ought to be rectified."

In a letter dated June 30, 1802, Caldwell expresses anxiety concerning Smith's health, of which an unsatisfactory account was given him by Dawson Turner, who was then in Ireland. "Mr. Turner is a very pleasant lively young man; his wife seems a most amiable well-inform'd woman. They have been very busy since they came, but the chief objects of the journey he was obliged to give up. I was out one excursion with him, he was polite enough at least to say he was much gratified, and yet I don't think he made any rich discoveries. His Lichens and Mosses are so minute and difficult I give them up, it is a part of Botany I have not attended to." A further passage may be cited as an example of Caldwell's style: "Summer I believe may be given up for this year, the weather is really so cold I have been glad to put on my fire again; when the servants in the kitchen have constantly a cheerful hearth I have no notion why the gentleman above stairs should sit shivering because the almanack tells him it is the beginning of July." In the autumn of this year Caldwell visited Harrogate for his health; his letter thence contains nothing of botanical interest.

On July 8, 1803, Caldwell arranges to meet Smith in Liverpool, and suggests that the latter might visit Dublin and perhaps deliver a course of lectures "to encourage and diffuse the taste for a favourite science." He speaks of his "tolerably large library, very miscellaneous and diverting," and of "an immense collection of prints and drawings" which had lately been bequeathed to him by the "first clerk in the Secretary of State's office in the Castle"—a man of French Huguenot descent, named Mangin, to whom Caldwell was greatly attached. This we learn from the letter of 21 Oct., in which Caldwell expresses his regret at not having met Smith in Liverpool.

On July 11, 1804, Caldwell writes of a visit to Cambridge, where he had been very cordially received; here he met Dr. Edward Daniel Clarke (1769–1821), the traveller and antiquary—"one of the most engaging men you ever met with"—who "visited Pallas in the Crimea and purchased his herbarium. The Doctor said he was old, and when he died nobody there would think it of value, and it would be thrown out of the window." The actual purchase of the herbarium was made by John Marten Cripps (d. 1853), to whom Clarke was tutor, and who accompanied the latter on his *Travels* in Russia, etc.: "the plants collected during the route were the result of their mutual labour" (p. iv). A note in Clarke's work (i. vi. 1810) runs: "Mr. Lambert is the present possessor of the celebrated Herbarium of Pallas, purchased by Mr. Cripps during his residence with the Professor [Clarke], and brought to England in the Braakel by Captain George Clarke, of the Royal Navy, A.D. 1805." It would appear therefore that subsequently to Caldwell's visit (1804) Pallas's herbarium, instead of being "thrown out of the window", was disposed of by Clarke to Lambert. At Lambert's sale in 1842, Pallas's herbarium was purchased for £49 for the British Museum: it is now in the Department of Botany. The botany of Clarke's *Travels* will form the subject of a later note.

Caldwell's last letter (7 March, 1808) is not in the MS. correspondence. It is rather sad reading: his health was failing, and his solitary life (he was not married) although not in itself "distressing," became so when sickness prevented him from reading, and he had passed "a melancholy, lonely winter." He had "endured a long truce with botany," but had just been to the Garden—"the first visit since last June." "Botany, that in England unites people and classes them in friendship, produces here a contrary effect; they are all at variance: the University has displaced Dr. Scott [1757–1808], an ingenious, lively man with great merit, and a good botanist." He was looking forward to seeing Smith in London, "where I scheme to be at the latter end of next month"; but this hope was not destined to be fulfilled, and he died at the residence of a nephew near Bray, Co. Wicklow, on the second of July of the same year.

It may be worth while to notice briefly the other "letters relative to Ireland" published in Chapter ix of the *Memoir and Correspondence*. One of these is from Lambert (1761–1842), dated "Castle Bourke, near Tuam, May 1790": in this he mentions the plants which he observed during his ascent of Croagh Patrick, including *Daboecia polifolia*.* Lambert's copy of Hudson's *Flora Anglica* (ed. 2), which is in the Department of Botany, contains numerous notes in his hand on the plants of this and other parts of Ireland. He visited Patrick Browne at Ballinrobe and "found him in bed quite a cripple with old age and the gout. He showed me a copy of a *Flora Hibernica*, which seemed not much more than a catalogue and very imperfect. Some old plants he has mentioned as new species, and showed me a specimen of the *Juncus sylvaticus* for one. The copy that was in London* is coming over here for correction, which I rather think he will have some difficulty in doing. He talked to me a great deal about the Jamaica plants and the number he had formerly sent to Linnæus, who he told me corresponded with him above twenty years ago."

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* A letter from Richard Duppa appended to this refers to "the genus *Daboecia*"—a name which, as a footnote points out, did not exist at the time the letter was written (1827). It was published in 1834 by David Don, from whom Duppa may have heard the name in conversation.

Two long letters from Walter Wade (d. 1825) contain interesting matter. The first (Nov. 7, 1801) is mainly occupied with an account of *Eriocaulon septangulare*, which he had earlier in the year added to the Irish Flora. Wade had intended to write a *Flora Hibernica*, but this plan was never carried out; in his *Plantæ Rariores in Hibernia inventae* (1804), reprinted from the *Transactions of the Dublin Society*, vol. iv, he indicated that circumstances had occurred which might possibly prevent its publication. The second letter gives an account of a visit to Killarney and of plants there noticed (Nov. 1, 1805) and was accompanied by a collection of Mosses gathered in that year and in 1796. He refers to a proposed Flora of Ireland by Templeton which had been indicated by Dawson Turner in the preface to his *Musci Hibernici*, and again indicates that his own Flora was not likely to appear.

SHORT NOTES.

POTAMAGETON DRUCEI (pp. 37, 87).—Mr. Druce in the recently published *Report for 1915 of the Botanical Society and Exchange Club of the British Isles* (p. 224) states that in this Journal for 1899 (p. 524) Fryer "established it as a full species." I have already pointed out (p. 87) that in 1907 Fryer's matured opinion was that the plant was a hybrid (*lucens* × *polygonifolius*) and at a still later date (August 30th, 1910) he wrote to me: "*Drucei* seems to be *polygonifolius* × *lucens*." It seems therefore hardly right to quote as Fryer's final opinion a conclusion which he subsequently abandoned. Mr. Druce (*l. c.*) says that he "found it fruiting on the Loddon River, its only known habitat": if the fruit were really ripe, it is of course an evidence against hybridity. —ARTHUR BENNETT.

PRIMULA ELATIOR Jacq.—Mr. Willians (Prodr. Fl. Brit. p. 418 (1910)) mentions that "the scented plant as found in England seems to have been described as a species by [E. H. L.] Krause under the name of *P. fragrans* in Ber. Deutsch. Bot. Ges. ii, 171, 1884." But in Prahl's Krit. Fl. Schlesw.-Holstein, p. 175 (1890), E. H. L. Krause records the plant under *P. elatior*: "α. *inodora* (Willdenow unter *P. veris*) . . . *f. uniflora* Hennings! . . . β. *fragrans* K. E. H. Krause! Archiv. d. V. d. Freunde d. Naturg. Mecklenb. 36, S. 130 [1883] . . . γ. *decipiens* Sonder Fl. Hamb.

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* This was probably the one now in the Linnean Society's library.

S. 113. . . ." Sonder describes this as "tomento breviore, dentibus calycis campanulati ovalis acutis, corollæ limbo concaviusculo." The hybrid between *P. elatior* and *P. officinalis* Krause gives as "× *P. media* (Petermann) Beyer Ver. bot. V. Prov. Brandeb. 29, S. 26." (Prahl, *l. c.*) Hennings named his *f. uniflora* in Schrif. nat. V. Sch.-Holst. 2, 1, p. 185 (1876). In Mr. Miller Christy's excellent account of the species (Journ. Linn. Soc. xxxiii, p. 172 (1897)) and its distribution, he does not notice these varieties.—A. Bennett.

Juncus castaneus on Ben Lawers (p. 145).—Mr. L. Cumming's remark that this is "rare or unknown on that mountain" is contrary to my experience. Don (Fasc. Brit. Pl. v, n. 85) claims to have discovered it on Ben Lawers in 1794, and Smith, who first described the species (Fl. Brit. i, 385, 1800) says Dickson and Mackay gathered it on that hill. Balfour in the Excursions observed it in 1847 and 1855; Boswell Syme (Eng. Bot. x, 15) says he has "gathered it to the south, east, and west of the peak"; and I have specimens gathered by myself in 1874, 1888, and 1898, and have many times observed it on my twenty-two visits, including 1911, with the Internat. Phyto-Geographical Excursion; so that there is a fairly continuous history of its occurrence during upwards of a century. Mr. Cumming's discovery of *C. rariflora* (I assume he is certain of its correct identification) is one of great interest, and I know of no other record for the Breadalbanes. I may add that I noticed a solitary example of *Veronica alpina* on Ben Lawers in 1888 which I left untouched —a plant which neither Buchanan White nor Peter Ewing ever gathered there—indeed the latter was very sceptical of its occurrence. Mr. D. Haggart, whose knowledge of the hill is probably unrivalled, tells me he has recently gathered it there. *Saxifraga rivularis* still exists in small quantity.—G. Claridge Druce.

Rubus fruticosus (p. 54).—I venture to point out several considerations which make it impossible—in the view, I suppose, of most students of the subject, including the Rev. W. Moyle Rogers—to apply this name to *R. rusticanus* Merc. 1. As Babington (*British Rubi*, pp. 65, 66) pointed out, the numbered specimen in Linnæus's herbarium, under *R. fruticosus*, is not *R. rusticanus* Merc., but *R. plicatus* (though fragments of the former, *unnumbered*, are also present). Clearly *R. fruticosus* L. is an aggregate species: and even if it were not so, our *R. plicatus* would have first claim to the name. 2. Nyman's *Conspectus* shows that *R. rusticanus* does not occur in Sweden. But *R. fruticosus* L. is avowedly built up on *Fl. Suecica* ed. 1, and is used therefore in *Species Plantarum* to cover a Swedish species. It cannot then refer to *R. rusticanus* only. 3. The figure of "Camerar. in Matth. Epit. Util., p. 751," affords no clue. It might, except for the prickles, do as well for a *Fragaria* or *Potentilla* as for a *Rubus*. 4. In confirmation of the conclusion on which these facts converge, it is worth noting that in ed. 3 of *Species Plantarum* (i, 707) the leaves of *R. fruticosus* are described as "subtus subvillosa";

while *Flora Suecica*, ed. 2, p. 172, says they are "subtus villosa mollia viridia." Anything more unlike *R. rusticanus* in foliage can hardly be conceived.—H. J. RIDDLESDELL.

A CORRECTION.—On p. 25 the locality for *Eriophyes ononidis* (on *Ononis repens*) is given as "Southampton." This is an error. I sent the specimen to Mr. Swanton, but omitted to give the locality whence I had it. It should be "Peveril Cliffs, Swanage." —J. F. RAYNER.

BOOK-NOTES, NEWS, &c.

AT the meeting of the Linnean Society on May 4th Mr. E. A. Bunyard read a paper on "The Origin of the Garden Red Currant." He stated that until recently the Red Currant was regarded as descended from *R. rubrum.* Janczewski, however, showed in 1907 that *R. vulgare* of Lamarck was the species chiefly concerned: in his collection of garden varieties 44 were derived from *R. vulgare*, 1 from *R. petræum*, and 4 from *R. rubrum;* 3 of these last were unnamed varieties from Lithuanian gardens. Mr. Bunyard has collected 70 varieties from Europe and America, and considers Janczewski has undervalued the importance of *R. rubrum.* The influence of *R. petræum* can also be traced in many varieties. The Red Currant has been cultivated from the early fifteenth century, and was at first pure *R. vulgare;* for 100 years no variations were recorded. *R. petræum* was introduced into gardens in 1561 by Konrad Gesner, and a few years after Camerarius mentions the "old" red and a new variety "baccis rubris majoribus." *R. rubrum* seems to have come into Currant history at a later date. A large fruited variety, called by Janczewski *R. vulgare macrocarpum*, was introduced in 1840 and is considered by him a mutation or giant form of *R. vulgare.* The origin of this variety is uncertain, but neither in size of fruit nor in other characters does it exceed forms of *R. petræum* which have been found wild. Mr. Bunyard considers that inter-hybridisation of the three species—*R. vulgare, R. rubrum*, and *R. petræum*—is sufficient to account for the numerous varieties of the Red Currant as grown in gardens to-day, and the supposed effects of cultivation need not in this case be invoked. Mr. F. N. Williams, from his own recent study of the British forms, supported Mr. Bunyard's conclusions.

At the same meeting Dr. J. C. Willis discussed the subject of the Dispersal of Organisms, as illustrated by the Floras of Ceylon and New Zealand. He stated that in two recent papers on the flora of Ceylon, and in a forthcoming one on the flora of New Zealand, he had brought forward conclusions on geographical distribution which, if accepted, will remove that subject from the immediate realm of evolution, and show that it may be largely studied by arithmetical methods. Once a species is evolved, its distribution depends upon causes which act mechanically. As all families and genera behave alike, it seems to him that one cause only must be responsible for their behaviour, but a combination of causes may be acting, though in that case each cause must act mechanically on all alike. The cause which seems the determining factor in dispersal is *age* within the country concerned. This opinion was based upon the results of his work on the Ceylon flora, which showed that the endemic species (presumably the youngest) occupied much the smallest areas, those common to Ceylon and South India (next youngest) areas considerably larger, and those of wider dispersal than this (the oldest) areas yet larger again, while at the same time each group showed a graduated series of plants occupying each size of area, the endemics varying down the scale from 90 to 233, the wides up from 144 to 462. Not only do the grand totals show this distribution according to age, but also family by family, and genus by genus (of reasonable size) do so. The rarity of all the endemics (in figures from 1 to 6) is 4·3, and when taken in groups of not fewer than 14 it only varies from 3·9 to 4·9, while that of the other two groups varies similarly about 3·5 and 3·0. Some having objected that Ceylon is a special case, he obtained confirmation of his views by working out the flora of New Zealand. To test his hypothesis, he wrote the paper first predicting what, under that hypothesis, must be expected, and as all his predictions were confirmed by the facts, the result has given him considerable confidence in the truth of the hypothesis. One does not often come across cases like Ceylon, where the local species can be divided into groups according to age, and confirmation of his hypothesis must rest on finding cases to parallel one or more of the features which showed so conspicuously in the Ceylon flora. New Zealand parallels it in several respects, and other cases are quoted in which similar parallelism is exhibited. Some of the objections to these views were considered, *e.g.* the hackneyed argument that introduced species spread rapidly over islands at the expense of the indigenous flora; this is shown by the cases of Ceylon and Rio de Janeiro to be an unsound position. The objection that the endemic species are the oldest in a country was also dealt with, likewise that which asks why one does not see the spreading going on, if it depend upon age.

In upland regions of Japan there occurs in autumn a very poisonous fungus growing on dead beech trunks and commonly known by the name "Tsukiyo-také"—the moonlight fungus. S. Kawamura in the *Journal of the College of Science* (Tokyo, vol. xxxv, 1915) names the fungus *Pleurotus japonicus*; it had previously been called *P. noctilucens* by Inoko, but this name was preoccupied and was moreover a *nomen nudum*. It is an interesting fact that many of the luminous fungi belong to the genus *Pleurotus*, though it is not commonly known that such common species with us as *Fomes annosus* and *Polyporus sulphureus* sometimes display luminosity, and the mycelium of *Armillaria mellea* seems always to be luminous. Kawamura's account gives full details of his investigation. The light is emitted only by the gills, both hymenium and trama being luminous. Luminosity is displayed over a range from about 5° C. to 40° C., being most abundant about 12° C. The effect of various gases was tried: nitrogen, hydrogen, ether vapour and chloroform vapour destroyed the luminous effect, whereas oxygen causes no change. The light can be perceived at a distance of at least thirty metres; it is white and not coloured as it usually is in fungi. Two plates are given showing the morphological characters of the fungus; a third gives prints of a fern frond and a maple leaf taken by the light of the fungus on a photographic dry plate. The paper is full of biological interest, and is further valuable for comparison with the results obtained by other investigators.—J. R.

W. O. Gloyer has published in the *Technical Bulletin* 44 of the New York Experimental Station an account of his investigations on the cause of stem-rot and leaf spot of *Clematis.* He shows conclusively that the cause of the disease is the fungus *Ascochyta clematidina* Thüm. "Considering the variability of the fungus found by the writer, any of the descriptions given for the different species of *Ascochyta* described on *Clematis* would in general apply to it": he therefore emends Thümen's description to include these forms. Methods of control and prevention of the disease are studied, and the result seems a very sound piece of work. The paper is illustrated by five plates.—J. R.

Those who study Agaricaceæ have for some time paid more and more attention to anatomical details, with a view to obtaining facts which will be of use in discriminating between closely allied species, in deciding whether certain species regarded as more or less cosmopolitan are truly so, and for ascertaining whether some of the rarer species are not really forms due to habitat, etc. Any contribution to the unravelling of the systematic points raised by the myriads of fleshy evanescent forms is welcome. Some genera—*e. g. Inocybe* and *Mycena*—have been found to show microscopic characters which are exceedingly valuable for differentiating species, and doubtless many others will become much clearer when so treated, though it is not yet apparent what structure will be found of specific value. H. S. Yates in the *University of California publications in Botany* (vol. vi, pp. 221–265, 1916), has a paper on the comparative histology of Californian *Boletaceæ.* The investigation deals with six well-defined species; under three of these it has been possible to separate certain definite forms—from *Ceriomyces communis* four, from *C. crassus* two and from *Suillellus Eastwoodeæ* two. The nomenclature adopted is that favoured at New York; the species would all be placed in the genus *Boletus* by mycologists in this country. The structures principally studied were the surface and content of pileus and stipe, and the hymenial surface: the details are figured in five plates. The author says: "While at present I am not able to bring forward histological details to separate all the species, it seems probable that this might be possible if the series of species described as to their histology were sufficiently large." What he does seem to have done, more effectively perhaps because unintentionally, is to demonstrate the impossibility of some of Murrill's genera.—J. R.

NEW OR NOTEWORTHY FUNGI.—Part V.

By W. B. Grove, M.A.

(Plates 542, 543.)

This Notice of New or Noteworthy Fungi is a continuation of Part iv, which appeared in the *Journal of Botany* in January and and February, 1912. I have to thank Dr. J. W. Ellis, of Liverpool, for kindly sending me several new species which he has met with, as also specimens of others which have not hitherto been found in this country. The Birmingham Natural History Society has kindly made a grant, from the Endowment of Research Fund, towards defraying the cost of the plates illustrating this paper.

213. **Sordaria coronifera** sp. n.

Peritheciis oblongo-conicis, plus minus immersis, ½–1 mm. altis, atris, rugulosis, sæpius ostiolo majusculo nitido conico instructis, tandem glabro apice umbilicatis, at sub apice pilis 5–15 atris acutis curvulis divergentibus, ex hyphis fasciculatis compositis, coronatis. Ascis clavatis, ca. 200 × 40 μ (part. sporifer.); sporidiis ellipticis v. subamygdaloideis, albidis, dein fuscis, denique opacis, atris, parte super. distichis, 32–40 × 18–23 μ, primo caudis duabus hyalinis curvulis (inferiore longiore) præditis, appendiculo superiore tandem parvo hemisphærico, inferiore curvulo cylindrico, ca. 15–20 × 4 μ. (Tab. 542, fig. 2.)

Hab. in stercore equino, Earlswood, prope Birmingham, Oct.

The appendages of the perithecia are as much as 350 μ long, and point in all possible directions; they are composed of many fasciculated hyphæ, but taper to an acute point. The texture of the perithecium is soft, translucent-brown. This species is very similar to the varieties *coronata* and *aloides* of *S. curvula* De By. (Sacc. Syll. i, 234), but the appendages are more elaborate; it is, in fact, a further advance on them in complexity.

214. Diaporthe stictostoma Sacc. Syll. ii, Addenda p. xlviii. *D. punctostoma* Ellis in Amer. Nat. 1883, p. 316.

Stroma elevated, tubercular, ½–¾ mm. diam., formed from the unchanged cortex, each enclosing 3–8 circinating perithecia, which are monostichous and just pierce the dark-olivaceous disc by the round ostiole. Asci clavate-cylindrical, obtuse and bifoveolate at the apex, 55–60 × 8–9 μ (part. sporif.). Spores biseriate, except above and below, oblong-ellipsoid, often somewhat attenuated at one end, hyaline, 1-septate, 3–4-guttulate, faintly constricted, 12–14 × 4–4½ μ. (Tab. 542, fig. 3.)

On twigs of Apple, originally prepared for grafting, Bristol, October, 1915 (comm. A. D. Cotton). The stromata occurred mainly at the base of the twigs and were accompanied on the other parts by a large quantity of the pycnidial stage, *Cytospora stictostoma* Grove (see no. 227) and also by a curious minute staurosporous Hyphomycete whose position could not be traced.

215. Leptosphæria Fuckelii Niessl in Voss, Zwei neue Ascom. p. 1. Sacc. Syll. ii, 71.

Perithecia single or a few arranged in a line, in the latter case erumpent by a fissure, subglobose, black, with a short ostiole; texture angular-parenchymatous, olivaceous-fuscous. Asci subclavate-cylindrical, rounded above, very shortly pedicellate, about 110 × 11 μ, surrounded by numerous, filiform, plainly articulate paraphyses, 3 μ wide and a little longer than the asci. Sporidia distichous, cylindrical or slightly tapering downwards, straight or more often slightly curved, 5-septate, yellowish, the fourth loculus from the apex protuberant, 28–32 × $4\frac{1}{2}$–$5\frac{1}{2}$ μ. (Tab. 542, fig. 1.)

On the lower part of old culms of *Phalaris arundinacea variegata*, in a garden, Burcot, near Bromsgrove (Ws.), May. The perithecia were found especially near the nodes. The last-formed septum of the spore is the second from the top; it is this which gives the peculiar character to the species. Accompanying the *Leptosphæria* was a *Phoma*.

216. Leptosphæria (Pocosphæria) pellita Sacc. Syll. ii, 41. Var. cirsiicola v. nov.

Peritheciis gregariis v. seriatis, primo epidermide ostiolo papillato perforata velatis, dein epidermide corticeque excussis denudatis, depresso-sphæricis, atris, undique ostiolo excepto pilis copiosis rigidis radiantibus septatis olivaceo-nigricantibus obsessis, pilis sursum pallidioribus, 200–300 × 3 μ. Ascis clavatis, breviter crasseque pedicellatis, 80–100 × 10–14 μ, paraphysibus copiosis hyalinis filiformibus, ca. 1 μ cr., pluriguttulatis obvallatis; sporidiis tristichis, fusoideis, flavidis, 8-10-septatis, 45–56 × 3–4 μ, loculis uni- v. bi-guttulatis, loculo tertio v. quarto inflato.

Hab. in caulibus emortuis *Cirsii arvensis*, Glenariff Hiberniæ, vere, 1911.

The whole perithecium reminds one somewhat of a dry closed *Vermicularia*, about $\frac{1}{2}$ mm. broad. There can be little doubt that this variety belongs to the species figured by Currey (*Simple Sphæriæ*, fig. 129); the spores are exactly the same except that they are a little longer. They are so closely clustered together in the ascus that, until they are extruded, one might almost think that they were those of *Ophiobolus acuminatus*, which the perithecia resemble as well until the epidermis is removed. There appears then a likeness to *O. Cirsii*, which is also beset with filaments at its base, but the spores are very different in shape and only half as long.

217. Phoma rubiginosa Brun. in Act. Soc. Linn. Bordeaux, 1898, p. 10 extr. Sacc. Syll, xiv, 873.

Pycnidia minute, black, scarcely erumpent, black within. Spores oblong, biguttulate, 5 × 2 μ.

On dry fruits of *Rosa rubiginosa*, France.

Var. circumstipata var. n.

Pycnidiis dimorphis, 1–3 majoribus ($\frac{1}{6}$–$\frac{1}{5}$ mm. diam.) gregibus minorum circumstipatis, atris, collo brevi per rimulam longitudinalem erumpentibus. Sporulis oblongo-ovoideis, 6–10 × 2–3 μ, plerumque eguttulatis.

Hab. in aculeis *Rosæ caninæ*, Lapworth (Wk.), Maio; pycnidiorum greges maculas parvas cinerascentes efformant.

This variety is remarkable for having in the centre of the groups 1–3 larger pycnidia closely surrounded by a number of smaller ones; all have similar spores. It is connected with the type (which has not yet been found in Britain) by the variety *major* Syd. (Sacc. Syll. xvi, 860). The latter has scattered or gregarious pycnidia erumpent by a fissure, and oblong spores without guttules, 6–10 × 3 μ; it occurred in Germany on dry fruits of *Rosa inodora.*

218. Phoma Lavandulæ Gabot. in Nuov. Giorn. Bot. Ital. 1905, p. 69. Sacc. Syll. xviii, 258.

Pycnidia on the stems, solitary, lens-shaped, somewhat prominent, black. Spores oval or fusoid, 2-guttulate, 4 × 2 μ; sporophores acicular, hyaline, 12–14 μ long.

On stems of Lavender, Kew Gardens, August. The plants were attacked while still alive, but looking weakly. The fungus agreed exactly with the description except that the pycnidia were very numerous and crowded; they were 150–200 μ diam., pierced by a round pore; texture thin, parenchymatous. The fungus is probably a wound parasite; the whole bed at Kew was being gradually destroyed.

219. Phoma lirelliformis Sacc. Syll. iii, 87.

Pycnidia densely gregarious, arranged parallel to one another, linear-oblong, ½–¾ × ⅛ mm., immersed, then erumpent by a fissure. Spores ovoid-oblong, straight, 2-guttulate, 7 × 3–3½ μ; sporophores not seen.

On branches of *Rhamnus.* The type not yet found in Britain.

Var. aucubicola Brun. in Act. Soc. Linn. Bord. 1888, p. 15 extr. Sacc. Syll. xiv, 871.

Spores elongate-oblong, straight or curvulous, biguttulate, 8–12 × 3–3½ μ. (Tab. 542, fig. 4.)

On dead branches of *Aucuba japonica*, Botanic Gardens, Birmingham, March. In these specimens the parallel cracks in the epidermis are strongly marked; they are mostly transverse and, while often as in the type, may reach at times a length of 3 mm. without any increase in width. The spores are intermediate in form between the type and the variety. The sporophores are subulate, 10 × 2 μ. With the *Phoma*-spores were mixed a small quantity of elongate, linear spores, 15–20 × ¾ μ, borne on similar sporophores: these spores seem to become hooked, when freed from the sporophore.

220. Phoma (Phomopsis) Arctii Sacc. Syll. iii, 122.

This fungus is already known as British, but the published accounts do not seem to be quite correct. It occurs on dead stems of *Arctium* of the preceding year, in company with *Diaporthe Arctii* Nits. The spores, which are lanceolate-oblong, biguttulate, 7–9 × 2½–3 μ, are as near as no matter like those described by Saccardo, but there is no true pycnidium. There is merely a blackened layer of altered epidermis, lying above the proligerous stratum on which the *Phoma*-like spores are produced. This can be traced, on other parts of the same stem, into a stroma which covers a rather dense sclerotioid mass of colourless cells, and finally into the ordinary perithecia-bearing stroma of the *Diaporthe*. The so-called *Phoma* is in fact hardly distinguishable from a *Leptothyrium*. Among the spores were seen a small number of the peculiar uncinate sporophores which are considered a distinguishing mark of the subgenus *Phomopsis*. These looked exactly like the "walking-stick" spores of some species of *Phlyctæna*. (Tab. 542, fig. 5.)

In view of the disputed question whether these really are sporophores or another kind of spore, a careful investigation was made of the hymenium of this species. The proligerous stratum is composed of a mass of small olivaceous cells; the erect colourless cells which constitute the hymenium vary greatly in shape and size, but can be arranged in a gradual series, beginning with those which are merely oblong, passing on to ampulliform cells with a flask-shaped base and an acute apex, then into longer lanceolate cells on the apex of which a young spore is borne; these finally become acicular, and in that stage the spore has usually been cast off. No filiform or hooked structures were seen *in situ*, only loose among the spore-mass, but since these agreed in size with the acicular sporophores and some of them still had one end slightly thicker than the other, the conclusion seemed to be inevitable that they constituted the final stage in the development of the sporophores, but that they did not assume the uncinate-filiform appearance until they had been cast loose from the hymenium, after losing their spores. Nevertheless, filiform spores (which became hooked when free) were seen *in situ* in *Phoma lirelliformis* (see preceding species), which is probably also a *Phomopsis*.

221. PHOMA STRIÆFORMIS var. HYSTERIOLA Sacc. Syll. iii, 132.

Pycnidia immersed, erumpent by a slit in an hysterioid manner, forming linear black streaks parallel to the striæ of the stem. Spores lanceolate-oblong, acute at one end, 6–8 × 2½–3 μ, biguttulate; sporophores long, acicular.

On stem of *Chærophyllum temulum*, Storeton, Cheshire (J. W. Ellis), March. The specimens which I attribute, somewhat doubtfully, to this variety have exactly the appearance of a *Phomopsis* such as that just described; there is no true pycnidium, but merely the altered epidermis, and the spores are borne on sporophores longer than themselves, as in that species.

222. PHOMA IRIDINA Maire & Sacc. Syll. xvi, 1154.

Pycnidia scattered, oblong or lanceolate, immersed, at length erumpent, convex, black, up to ¼ mm. long, surrounded at the base by a few brown hyphæ; texture parenchymatous, dark-brown. Spores oblong-fusoid, subacute at both ends, especially below, 7–9 × 2–2½ μ.

On dead bleached flower-stalks of *Iris Pseudacorus*, Quarry Pool, Hamstead (St.), April. In the sixteenth volume of the Sylloge, this is recorded on dead bleached stems of *Iris fœtidissima* in Corsica, and is placed as a subspecies of *Phoma Agapanthi* Sacc. (Syll. iii, 158), from which it differs merely in the narrower spores. The Corsican specimens are described as much larger ($\frac{1}{2}$–$\frac{3}{4}$ mm. long), but the Staffordshire specimens seem to be identical with them in all other respects.

223. SPHÆRONÆMA CORNUTUM Pr. Fung. Hoyersw. no. 144, Sacc. Syll. iii, 195.

Pycnidia gregarious, nearly superficial, black, 120–200 μ diam., growing on wood, subglobose, covered, especially in the lower part, with scattered black hairs ; neck very long, cylindrical, quite straight or slightly flexuose, divided into fibrils at the apex ; contents whitish, oozing out and forming a globule at the mouth. Spores oblong-ovoid, 3–4 × 2 μ, mostly immature and immersed in a thick jelly. (Tab. 542, fig. 10.)

On dead wood, Sutton Coldfield, 1885. This fungus appeared again in 1915, on soft decaying wood (? willow), Windmill Naps, Tanworth, January–May, being first seen on a piece of wood, kept in a moist chamber, on which *Panus stypticus* was being grown, but afterwards found on other pieces of rotting wood, brought from the same locality by Dr. Bayliss-Elliott. It seems to be characterised by the erect brown-black flocci which are dispersed over the surface of the pycnidium and the adjoining wood, and by its very long slender cylindrical beak, which was at least 1 mm. long and 25–30 μ wide at the middle. Preuss described the spores as "guttulis repletis" (ex Sacc.) ; this was not observed, but they had a habit, when expelled in water under the microscope, of collecting together in rounded masses of 6–12, looking almost as if enclosed in an ascus.

224. **Fusicoccum Aceris** sp. n.

Stromatibus sparsis, depresso-conicis, peridermio innatis, dein rima v. ore irregulari emergentibus, atro-cinereis, $\frac{1}{2}$ mm. latis, intus pallido-succineis. Sporis copiosissimis, fusoideis, fere rectis, apicibus subacutis, achrois, 12–14 × 2–2$\frac{1}{2}$ μ, primo continuis, dein septo mediano spurio (?) præditis v. saltem plasmate bipartito, sporophoris simplicibus, linearibus, sporam subæquantibus, 1$\frac{1}{4}$ μ latis suffultis. (Tab. 542, fig. 8.)

Hab. in ramulis *Aceris* sp., Cheshire (J. W. Ellis), April. It should be compared with *F. Carpini* Sacc. (Syll. iii, 250).

225. FUSICOCCUM GLŒOSPOROIDES Sacc. & Roum. (Syll. iii, 249).

Stromata depressed-conical, scattered, immersed in the cortex, then erumpent by a roundish pore, blackish without, wavy and pallid or greyish within, with 1–several loculi. Spores oblong-fusoid, rounded above, rather acute below, continuous, straight, hyaline, 8–10 × 2–2$\frac{1}{4}$ μ ; sporophores lanceolate, 2 μ wide, rather longer than the spore. (Tab. 542, fig. 7.)

On twigs of *Corylus Avellana*, Cheshire (J. W. Ellis), April. This does not seem to be the same as *F. album* Sacc. (Syll. xi, 507),

= *Næmaspora alba* Pr., which also occurs, in Germany, on *Corylus*. Saccardo's record of *F. glœosporoides* is on *Betula* (?) in the Ardennes.

226. FUSICOCCUM QUERICINUM Sacc. Syll. iii, 248.

Stromata oblong-conical, some transversely placed, inflating the periderm, which at length splits and exposes a pale *Cytospora*-like disc; contents pale rosy-ochre, without the slightest tinge of black or olivaceous, surrounded (under the bark, as is seen when it is stripped off) by a whitish zone. Spores very numerous, cylindric-fusiform, acute at both ends, very slightly curved, colourless, 13–16 × 2½–3 μ; the protoplasm is sometimes bipartite in the middle, at other times biguttulate. (Tab. 542, fig. 6.)

On twigs of Oak, near Malvern (J. W. Ellis), May. Supposed to be the pycnidia of *Diaporthe leiphemia*. Cf. *Cryptosporium conicum* Bon. (Sacc. Syll. iii. 741), which seems to be very similar.

227. **Cytospora stictostoma** sp. n.

Stromatibus dense in ramulis gregariis, peridermio innatis, ¼–⅓ mm. diam., pustulatis, protuberantibus, e basi rotundata conicis, pseudolocellatis, contextu subceraceo atro-cinereo, disco truncato emergente albido-furfuraceo, vulgo poro atro unico centrali perforato. Sporulis oblongis v. subovoides, 7–9 × 2–2½ μ, e fronte visis præsertim basi subacutatis, vulgo biguttulatis, e latere curvulis et obtusatis, sporophoris stipatis subulatis ad 15 μ long. suffultis.

Hab. in ramulis *Pyri mali*, Bristol, socia *Diaporthe stictostoma* Sacc. (see no. 214). The spores of this species are very unusual for a *Cytospora*; the difference between the face and profile views is considerable.

228. **Ceuthospora Euonymi** sp. n.

Stromatibus amphigenis, dimorphis, (1) unilocularibus, (2) plurilocularibus: (1) Minoribus, ca. ¼ mm. diam., aggregatis v. subsparsis, globulosis, prominulis, atris, ore conico-truncato epidermidis laciniis cincto dehiscentibus; disco furfuraceo rufo-fusco v. dilute rubescente, quinetiam rubro. (2) Majoribus tardioribus, sparsis, applanatis, orbicularibus, discoideis, ½–¾ mm. diam., atris, nitidulis, diu solidis sterilibusque, denique poris conico-truncatis 1–3 (rarius 4) dehiscentibus; disco tandem sporis copiose expulsis obliterato. Sporulis homomorphis, cylindricis, rectissimis, utrinque obtusatis v. basi subattenuatis, perfecte hyalinis eguttulatisque, 14–17 × 2–2½ μ, sporophoris rectis, tenuibus, subæquilongis suffultis. (Tab. 543, fig. 1.)

Hab. in foliis ramulisque *Euonymi japonici*. Wallasey, Cheshire, September–December (Miss B. O'Loughlin, comm. J. W. Ellis). Southampton, March (J. F. Rayner, comm. A. D. Cotton).

The two forms of conceptacles stand to each other exactly in the same relation as *Cytospora Laurocerasi* Fckl. to *Ceuthospora Lauri* Grev., which should equally be regarded as one species. The larger conceptacles resemble perfectly those of *Ceuthospora phacidioides* Grev. but are distinguished by the usually more slender spores. *Cytospora foliicola* Lib., which may occur on the very same leaves, is distinguished from the smaller conceptacles not only by its (pallid) disc, but also by its smaller curved (sausage-shaped) spores. Its var. *Kalmiæ* Sacc., however, is not very different from *C. Euonymi*, and should be placed as a variety of the latter.

229. CEUTHOSPORA LAUROCERASI comb. nov. *Ceuthospora Lauri* Grev. Scot. Cr. Flor, pl. 254 (1827). Sacc. Syll. iii, 279.

Cytospora Laurocerasi Fckl. Enum. Fung. Nass. no. 437 (1860). Sacc. Syll. iii, 276.

On dead leaves of *Prunus Laurocerasus*. Common everywhere. Var. *ramulicola* Vize, Fung. Brit. no. 104, on dead shoots of the foregoing summer, = *Cytospora Laurocerasi* var. *ramulorum* Sacc., is equally common.

It is necessary, in consequence of the widespread impression, bred of Greville's mistake and Saccardo's statement in Syll. iii, 279, that Greville's *Ceuthospora Lauri* grew on *Laurus nobilis*, to point out that in Britain "*the* Common Laurel" meant (and still means) *P. Laurocerasus*. So far as I know, no *Ceuthospora* on *Laurus* has ever been found in Britain, certainly not by Greville, as his figure clearly shows in spite of his words. The genetic connection of the two above-mentioned forms, heretofore placed in distinct genera, becomes obvious when a comparison is made with *C. Euonymi* (no. 228), quite apart from the fact that little distinction exists between the two except in mere size, and that in this respect it is quite easy to obtain a complete gradual series between the small and the large conceptacles. In such a case it is clearly justifiable to choose the more accurate specific name, and drop the prior misleading one, for a false name, given in error, should not be allowed to carry any rights of priority. The hard dense stromata of the large conceptacles probably act as resting stages, being more or less of a sclerotioid nature, in both this species and *C. Euonymi*.

230. **Ascochyta Vincæ** sp. n.

Maculis amplis, irregularibus, fuscis, atro-brunneo-marginatis. Pycnidiis epiphyllis, paucis, centro maculæ congestis, atris, punctiformibus, leviter prominulis. Sporulis anguste fusoideis, rectis v. curvulis, basi magis quam apice attenuatis, interdum subinæquilateralibus, tenuiter 1-septatis, non constrictis, 11–14 × 2 μ.

Hab. in foliis *Vincæ majoris*, Ledbury, Martio.

231. DIPLODINA PASSERINII Allesch. vi, 678. *Ascochyta decipiens* Passer. in Atti Accad. Linc. (Roma), Rendic. 1891, vii, 49 (*non* Trail). Sacc. Syll. x, 300.

Spots none. Pycnidia densely gregarious, extending for some distance, depressed-globose, about 200 μ diam., subepidermal, pustular, fuscous-honey-coloured, pierced by a pore; texture thin, plectenchymatous, yellowish-brown. Spores cylindrical, rounded at both ends, not constricted, 7–12 × 2½–3 μ, oozing out in the form of a yellowish globule.

On base of stems of *Antirrhinum*, Birmingham, May. The oily contents of the cells of the spore assume different appearances according to age, and may even look, at first sight, as if there were more than one septum.

232. Septoria oxyspora Penz. & Sacc. Fung. Mortol. pl. 4, fig. 13. Sacc. Syll. iii, 565; Fung. Ital. pl. 1487.

Var. culmorum var. nov.

Pycnidiis confertis, plerumque in series secus fibras culmi digestis, tectis, minutis, depresso-sphæricis, atris, ca. 150 μ diam.; ostiolo epidermidem laceratam vix perforante; contextu parenchymatico, atro-olivaceo. Sporulis fusoideis, a fronte visis ferme rectis, a latere lunatis v. arcuatis v. flexuosis, deorsum acutioribus, granulosis, guttulis paucis irregularibus præditis, 13–19 × 3 μ; sporophoris vix conspicuis. (Tab. 542, fig. 9.)

Hab. in culmis *Dactylidis glomeratæ*, Burcot, prope Bromsgrove (Ws.), Maio, sociis *Leptosphæria microscopica* atque peritheciis quibusdam *Physalosporam* simulantibus (an *Leptosphæria* eadem junior?). The pycnidia are seated on a sparse creeping dark-olive articulated mycelium. Distinguished from the type chiefly by its smaller and narrower spores, its habitat, and the absence of the spots. The spores frequently have the exact shape of a boomerang.

233. Diplodia Saccardiana Speg. Mich. ii, 270. Var. anglica var. n.

Pycnidiis gregariis, majusculis, globosis, prominentibus, $\frac{1}{4}$–$\frac{1}{2}$ mm. diam., epidermide pustulata dein lacerata tectis, bullatis, atris, poro parvulo rotundo impresso pertusis; contextu solidiusculo, subparenchymatico, obscuro-olivaceo. Sporulis valde ludentibus, diutissime achrois, nubilosis, oleoso-farctis, ovoideis, subinde biguttulatis, 13–16 × 6–7 μ, sporophoris crassiusculis, rectis, hyalinis, 1 μ cr., sporis duplo longioribus suffultis, deinde brunneo-olivaceis, obovatis v. fusoideis v. clavulatis, quandoque inæquilateralibus v. curvulis, utrinque obtusiusculis, denique prope medium uni-septatis, interdum bi-septatis, leniter constrictis, 17–20 (usque 24) × 5–6 μ. (Tab. 543, fig. 2.)

Hab. in ramulis emortuis *Sarothamni scoparii*, Caughley, Salop. Maio (leg. J. W. Ellis).

There can be little doubt that this is a form of *D. Saccardiana* Speg. (*Sphæropsis* Sacc. Syll. iii, 292). It differs from that species in its larger pycnidia, which are not arranged in lines, in the larger and at length septate spores, and the total absence of the described "striæ." If it is a variety, then Spegazzini's species must be a *Diplodia*, not a *Sphæropsis*. Many pycnidia were examined that showed none but colourless spores, reminding one of a *Macrophoma*, but a faint suspicion of colour in some of the spores induced further investigation, until at last in a few of the largest pycnida the mature spores were discovered. The septa are variable; usually there is one septum in the middle, but occasionally it is nearer to one end, and in a few cases there were two equidistant septa. In a similar way to this *Phoma Pinastri* Lév. = *Sphæropsis Ellisii* Sacc. is really a *Diplodia* = *D. Pinastri* Grove.

(To be concluded.)

LATE GLACIAL PLANTS OF THE LEA VALLEY.

By Clement Reid, F.R.S.

[The *Quarterly Journal of the Geological Society* (lxxi, pt. 2, pp. 155–161, 1916) contains a paper by Mr. Clement Reid on "The Plants of the Late Glacial Deposits of the Lea Valley," Middlesex, which was read before the Society by the author on February 23rd last. It contains matter of such exceptional interest in connection with the early history of our flora that we have obtained permission from the Society to reprint the greater part of it in these pages. A plate accompanying the paper (in Q. J. G. S.) represents the material on which *Silene cælata* and *Linum præcursor* are based.—Ed. Journ. Bot.]

Since Mr. Hazzledine Warren's paper was published in 1912 * much work has been done in the pits at Ponder's End and Angel Road. Two other pits in the same district have also been investigated,† these being situated at Hedge Lane and Temple Mills. Thanks to the efforts of Mr. Warren, Mr. A. Wrigley, and Mr. E. T. Newton, a large amount of botanical material has been collected, and the flowering plants have been sent to me for examination. The additions thus made to the list are so numerous that we have now obtained one of the most interesting Arctic floras yet discovered in these low latitudes.‡ Several of the species until the present time have been unrecognised in the fossil state, and two seem to be new to science. In these circumstances it seems advisable to place on record the new finds, especially as some of them may be of zonal value.§ . . .

To how great an extent the peculiarities of this extinct Arctic flora of the Lea Valley are due to exceptional conditions of soil is not clear. It may prove that the presence of certain plants unknown elsewhere is assignable to the occurrence of an area of bare chalk in the higher stretches of the Lea Valley; nearly all the other British deposits yielding Arctic plants lie in catchment-basins of Boulder Clay, or of hard non-calcareous rock.

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* Q. J. G. S. vol. lxviii, pp. 213–51.

† Proc. Geol. Assoc. vol. xxv (1914), pp. 285–87.

‡ For the original list, see F. J. Lewis, in Warren, Q. J. G. S. vol. lxviii (1912), p. 229.

§ Specimens of all the species have been sent to the British Museum (Natural History), and of most to the Museum of Practical Geology also.

The list of plants is as follows:

Late Glacial Plants of the Lea Valley.	Angel Road.	Hedge Lane.	Ponder's End.	Temple Mills.
Thalictrum alpinum L.	×	..	×	×
Thalictrum flavum L.	..	×		
Ranunculus aquatilis L.	×	×	×	×
Ranunculns hederaceus L.	..	..	×	
Ranunculus repeus L.	×	×	×	×
Ranunculus Flammula L.	..	..	×	×
Ranunculus sp.	×			
Ranunculus sp.	×	×		
Draba incana L.	×	..	×	×
Cochlearia sp.	×	..	×	
Viola sp.	×	×	×	×
Silene Cucubalus (Wibel)	×	×		
Silene cælata sp. nov.	×	×	×	×
Lychnis sp. (not British nor Arctic)	..	×		
Cerastium arvense L.	..	..	×	
Cerastium sp.	..	..	×	
Stellaria aquatica Scop.	..	..	×	
Stellaria palustris Retz.	..	..	×	
Montia fontana L.	..	×		
Linum præcursor sp. nov.	×	×	×	×
Vicia sylvatica L.	×	..	..	×
Potentilla erecta Hampe	×	×	×	×
Potentilla Anserina L.	×	×	×	×
Hippuris vulgaris L.	×	×	×	×
Myriophyllum spicatum L.	×	×	×	
Œnanthe ?	×			
Sambucus nigra L.	×			
Carduus nutans L.	..	..	×	
Carduus palustris L.	×			
Crepis virens L.	×			
Leontodon autumnalis L.	..	×	×	
Taraxacum sp.	×	×	×	×
Armeria arctica Wallr.	×	..	×	×
Menyanthes trifoliata L.	..	..	×	
Mentha ?	..	..	×	

Late Glacial Plants of the Lea Valley.	Angel Road.	Hedge Lane.	Ponder's End.	Temple Mills.
Atriplex hastata L.	×	×	×	×
Polygonum aviculare L.	×	..	×	
Polygonum Hydropiper L.	..	..	×	
Oxyria digyna Hill	×			
Rumex crispus L.?	×	×	×	
Rumex Acetosa L.	..	..	×	
Rumex sp.	..	..	..	×
Urtica dioica L.	..	..	..	×
Betula nana L.	..	..	×	
Alnus sp.	..	..	×	
Carpinus Betulus L.	..	..	×	
Salix repens L.	..	..	×	×
Salix Lapponum L.	×	×	×	×
Salix herbacea L.	×	..	×	×
Salix reticulata L.	..	..	×	
Salix sp.	..	..	×	
Sparganium minimum Fr.	..	×		
Alisma Plantago L.	..	..	×	
Scheuchzeria palustris L.	..	..	×	
Potamogeton heterophyllus Schreb.	×	×	×	×
Potamogeton crispus L.	..	..	×	
Potamogeton obtusifolius M. & K.?	×	×	×	×
Potamogeton spp.	×	×	×	×
Zannichellia pedunculata Reichb.	..	×	×	
Eleocharis palustris R. & S.	..	×	×	×
Carex pulicaris L.	..	..	×	
Carex incurva Lightf.	..	..	×	
Carex pallescens L.	..	..	×	
Carex riparia Curt.	..	..	×	
Carex spp.	×	×	×	×
Isoëtes lacustris L.	..	..	..	×
Chara sp.	..	..	×	

. . . . Some of the species deserve special comment:

Thalictrum alpinum. This is a common Arctic and Alpine plant, but does not seem to have been recorded in the fossil state. It has probably been overlooked, for its fruits occur at three localities in the Lea Valley, and they are found in similar Late Glacial deposits in the silted-up lakes near Edinburgh.

Ranunculus Flammula ? or *R. hyperboreus ?* Achenes of a *Ranunculus* somewhat resembling *R. Flammula* are not uncommon; they, however, do not satisfactorily agree either with this species or with *R. hyperboreus.* At present I can find nothing more closely resembling them. A second unknown species of *Ranunculus* is found at Angel Road; but the material is insufficient for determination. I cannot again find *R. acris,* recorded with doubt by Dr. Lewis; badly-preserved achenes of *R. repens* might easily be mistaken for *R. acris*.

Draba incana. The thin, tough, delicately-veined, oval valves of this plant are very abundant at three different localities in the Lea Valley. They are equally common in the Scottish Late Glacial deposits, though until now their true nature has not been recognised. They are probably the "small petal-like objects" mentioned by Dr. Lewis.* . . .

Silene Cucubalus and *S. cælata*, sp. nov. Dr. Lewis mentions two species of this genus, which he refers to *S. maritima* and *Silene* sp.: "one much-crushed specimen, species not determinable." I find a few seeds of *S. Cucubalus* at Angel Road and Hedge Lane, and these may correspond with Dr. Lewis's undetermined crushed seed from Ponder's End, though I have not yet seen a specimen from that locality. In addition to these seeds numerous seeds of another *Silene* were found at all four localities, which may be the plant determined as *S. maritima*. It is quite distinct, however, from *S. maritima*, and the discovery of the calyx and capsule, as well as the seed, show that it is an unknown species belonging to the section *Melandryum* and allied to our own living *S. noctiflora*, though the sculpture of the seed is very different. I can find no other living species at all near to it, and must therefore describe it as new.

SILENE CÆLATA, sp. nov.

Calyx late ovoideus, superne angustatus, inferne æquabiliter contractus, 16 + mm. longus, 10-nervis, 5-dentatus. Capsula ovoidea, inflata, infra haud umbilicata, 9 mm. longa, carpophoro quintuplo longior, in valvas sex triangulares dehiscens. Semina reniformia, lateribus complanata lacunosave, dorso rotundata, 1·3 mm. longa, 1·3 mm. lata, tuberculis lateralibus elongatis radiatis, jugis acutis tenuibus, sæpe extremitatibus furcatis, suturis plicatis, lobis circiter duodecim, tuberculis dorsalibus rotundatis obtusis, in lineas circa sex dispositis.

Calyx large, broadly ovate, narrowed above, and 5-toothed, regularly contracted into the pedicel below; 10-veined, secondary veins few; teeth broken off, but apparently awl-shaped.

Length = 16 mm. (without the teeth). Two specimens. Temple Mills.

Capsule ovate, inflated, not umbilicate below, 6 times the length of the carpophore, smooth, polished, faintly striate on the teeth, dehiscing in six triangular valves.

Length = 9 mm. One specimen. Ponder's End.

Seed reniform or roundly triangular, sides flattened or indented, back rounded; tubercles on the sides strongly radiate, with sharp thin ridges, often forked at the ends; sutures sharply and deeply foliate with about twelve lobes; dorsal tubercles roundly oval, blunt, in about six rows.

Length = 1·3 mm., breadth = 1·3 mm. Common at Angel Road, Hedge Lane, Ponder's End, Temple Mills; unknown elsewhere. . . .

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* Q. J. G. S. vol. lxviii (1912), p. 229.

Compared with *Silene noctiflora*, the fossil here described has a fruiting calyx of about the same size and somewhat similarly ribbed; but it is regularly narrowed into the peduncle, and the peduncle shows no inflated ring. The capsule resembles that of *S. noctiflora*, but is shorter and not umbilicate below. The seeds differ greatly from those of *S. noctiflora*, having indented striate sides with elongate tubercles—these late tubercles contrasting strongly with the six rows of rounded dorsal tubercles. At first sight, the seeds somewhat resemble those of *S. maritima*; they are very different from those of *S. noctiflora*, which has numerous rounded tubercles not noticeably arranged in lines.

This species . . . is a striking plant, which cannot well have been overlooked in the living state, and it seems to be the first undoubtedly extinct form that has yet been found in British Pleistocene deposits. Perhaps, like so many of the European Pliocene species, it may still linger in the mountains of China; but nothing allied to it seems yet to have been discovered there. . . .

LINUM PRÆCURSOR, sp. nov. Flax-seeds are abundant at all four localities in the Lea Valley, and their occurrence raises a very difficult question. Precisely similar seeds have been found also in the Arctic plant-bed at Hoxne, in Suffolk, beneath a deposit full of Acheulian implements, and a single seed has been discovered at Beeston (Norfolk), at the base of the whole of the Glacial deposits. In each case the flax-seeds are associated with dwarf Arctic willows, and with a moss flora of thoroughly Arctic character. The living *Linum* which they most closely resemble is the cultivated *L. usitatissimum*, of which the wild form is unknown; they do not agree with either *L. perenne* or *L. angustifolium*. But *L. usitatissimum* is not an Arctic plant, and there is no living Arctic plant that has a seed at all resembling the fossil here described. The origin of the cultivated flax has been much discussed, but so far without any definite result; it is grown over great part of the world, and in no region can it be said definitely that a corresponding wild form is found. As a cultivated plant it is found in Roman deposits and in the Swiss lake-dwellings, seeds from the Roman layer at Tooley Street being indistinguishable from recent specimens. It escapes from cultivation, but apparently never establishes itself in cold countries.*

On comparing the fossil seeds here described (we have, in addition, only fragments of the capsule) with cultivated seeds, it is found that the only difference of importance is the narrower and more oblong outline. This is a difference which may well be due to thousands of years of cultivation. If the Lea Valley fossils had been found in Pleistocene deposits containing temperate plants, we should refer them with little hesitation to the wild form of *L. usitatissimum*, till now unknown. The cultivated flax is, however, essentially a temperate species, and it is not easy to imagine that the flax of ancient cultivation in Egypt, found also in the Swiss lake-dwellings, can be descended from a plant essentially Arctic. Possibly the common flax of our latitudes may be a hybrid between this Arctic plant and a southern form, for there is more than one variety of flax in cultivation, though none seems quite to match the fossil here described.

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* See Planchon, in Hooker, Journ. Bot. vii, 165 (1848); O. Heer, *Die Pflanzen der Pfahlbauten*, p. 35 (Zürich, 1865); *id. Ueber den Flachs & die Flachskultur* (Zürich, 1872); A. de Candolle, *Origin of Cultivated Plants* (London, 1884).

In the circumstances, it is difficult to decide what name should be given to the Lea Valley *Linum*, for, so far as the seed goes, the differences are not sufficient to make it more than a variety of the common flax. But, even if it be treated as an ancestor, or one of the ancestors, of common flax, the question of nomenclature still remains. There seems as yet to be no definite rule which fixes the name to be applied to a wild form of an animal or plant originally described from cultivated specimens, and to which was given such a name as *usitatissimum*, implying domestication. I can only suggest the use of *Linum præcursor* in this case—for, although the plant may be the ancestor of our own flax, it is probably only one of the ancestors.

Dr. O. Stapf, the Keeper of the Kew Herbarium, having been consulted on this point, strongly advises the use of a new specific name for the fossils here described. He points out that the seed is markedly different in shape from that of *L. usitatissimum*, and that, in view of the Arctic climate indicated by the other plants, the relationship of the fossil to the living form is very problematic. He also points out that, in the case of the wild rice, we have a precedent for giving a new specific name to a plant which is probably the ancestor of a form long in cultivation.

LINUM PRÆCURSOR, sp. nov.

A *L. usitatissimo*, seminibus angustioribus magisque oblongis recedit.

Vicia sylvatica. This north-country vetch has not previously been recorded in the fossil state. Valves of the pod are not uncommon at Angel Road and Temple Mills; they are somewhat smaller than my recent specimens, but agree in other respects.

Armeria arctica. The fruiting calices of this Arctic-American and Greenland plant are common in the Lea Valley, but were only recognised as European fossils in 1914 by Dr. C. A. Weber.* They occur in various deposits in Britain; the plant is, however, no longer living in Europe or Asia, and I gave "Sibera" as a record through a misapprehension of Weber's account.†

Sambucus nigra. A single seed of the elder has been sent to me from Angel Road. It is in a different state of preservation from the other fossils, and may possibly be washed out of some more ancient deposit. From Ponder's End I have a single much-worn nut of *Carpinus Betulus*. Neither the elder nor the hornbeam is an Arctic tree, and I feel the greatest doubt whether either belongs truly to the same period as the Arctic willows. In each case the fruit is particularly hard and bony, and these fruits are among the very few British species which might be washed out of one bed and redeposited in another in a recognizable state. In the Arctic Bed at Hoxne worn nuts of hornbeam, derived from the underlying Temperate Bed, certainly occur; but no temperate plant-bed has yet been discovered beneath the Arctic Bed in the Lea Valley.

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* "Die Mammutflora von Borna," Abh. Nat. Ver. Bremen, vol. xxiii, pt. 1.

† C. Reid. "*Armeria arctica* Wallr. Fossil in Britain," Journ. Bot. vol. lii (1914), p. 215.

Oxyria digyna. This Arctic and Alpine dock has not previously been recorded fossil in England, although it occurs in one of the silted-up lakes close to Edinburgh.

Salix lapponum. This Arctic willow does not appear to have been recorded as a fossil elsewhere in Britain; it is common at all four localities in the Lea Valley, though the long slender leaves are difficult to extract without injury.

BATTARREA PHALLOIDES *PERS.* IN BRITAIN.

By John Ramsbottom, M.A., F.L.S.

Since the publication of my paper on *Battarrea* (p. 105) further information has been obtained. In Withering's *Botanical Arrangement* (ed. 2, iii, 448 (1792)) it is named "*Phallus campanulatus* (Woodward)" with the "English" name "bell-headed Morell." "In the Phil. Trans. it is referred to the genus *Lycoperdon*, and Mr. Dickson has introduced it . . . under the name of *Lycop. Phalloides*; but the distribution of the Fungi adopted in this work, compels me to rank it as a *Phallus*." Two localities additional to those of Dickson are given—Earsham and Kirby, Norfolk—both attributed to Woodward. In the third edition (iv, 376 (1796)) Dickson's name—*Lycoperdon Phalloides*—is used. "Its habit, and the mucilaginous matter between the coats of the wrapper had induced me to rank it as a *Phallus*; but in truth it is neither a *Phallus* nor a *Lycoperdon*, but a sort of connecting link between the two, and most probably forms a new Genus." No further records are given.

There is a letter (dated May 16th, 1844) in the Berkeley correspondence in the National Herbarium from Philip Frost, who was gardener to Lord Grenville at Dropmore, relating to his discovery of *Battarrea*. "Since I forwarded the specimen of *Batarrea phalloides* to Sir W. J. Hooker, I have not discovered any more of it, tho' about four years since, it was found in the same locality: the hollow part of an old ash tree, quite at the base, growing as it were out of the earth, and decomposed wood. From the rarity of the plant, and the general information you and Sir W. Hooker wish to obtain, I will go frequent to the spot to see if I can gain the information required, and forward it both to yourself and Sir W. Hooker. It was from his work I traced what the plant was, and seeing it was rare [this] induced me to forward the specimen to him, which I am exceedingly glad I did, as Sir William seemed so highly delighted in his communication to me. . . . At one time, in my younger days, I studied the Fungi, but of late my duties in my situation have occupied the whole of my leisure hours. . . . I judge about the end of summer is the time for me to find the *Batarrea*. I have been to the spot since I received your communication. I hope I might find it in the egg state, tho' I don't like to dig, fearing I might destroy it." From this letter it would seem that Hooker and Berkeley were anxious to obtain the fungus in the young state, when it is said by Woodward to be mucilaginous within, though from the appearance of the mature specimens this would not be expected.

With regard to the specimen from Wickham [Kent] near Croydon, mentioned by Plowright, as stated by Mr. W. A. Nicholson (p. 105) I have not been able to find any more exact reference. The figure by W. G. Smith is from the block used in the *Gardener's Chronicle*, 1873, p. 1111. The original water-colour drawing from which the block was made is in the Exhibition Gallery of the Department of Botany, and represents the largest of the specimens found at Nork by Mr. Spencer Perceval. Mr. W. B. Grove informs me that there is a specimen in Plowright's herbarium at Birmingham University, but this is one of the four Nork specimens.

A reference by Berkeley (Hook. Journ. Bot. ii, 518, 1843) to "Dickson's collection in the British Museum" led to a search for the specimen, which was not indicated as present in the British Herbarium in W. G. Smith's *British Basidiomycetes*. The genus-cover, which had been misplaced, contains two sheets. On the first are two specimens from the Broome herbarium both of which are Nork specimens, one having been sent to Broome by W. G. Smith, the other by the finder. The second sheet, written up in M. C. Cooke's hand (previous, therefore, to 1874), states that the specimen is "mounted and in the case outside with Sowerby's models." This specimen which was exhibited at Bloomsbury and is now in the exhibition gallery at South Kensington I believe to be Dickson's type specimen, though there is no indication of locality or date.

Two other specimens without locality or date were found in a box of odd specimens which was presented to the Museum by the Linnean Society. The writing on the specimens is apparently that of J. E. Smith, J. Dickson, and J. G. König. There are no specimens of *Battarrea* in the small collection of fungi in Sir J. E. Smith's herbarium at the Linnean Society, and these may therefore be the specimens he described.

MYCETOZOA OF NORTH DEVON.

By Norman G. Hadden.

The amount of woodland, the quantity of rotten timber left lying about, and the mild clear atmosphere all combine to make North Devon a very favourable district for the development of

Mycetozoa. The unusually heavy rainfall experienced last August, after a somewhat long period of drought, caused the sporangia to appear in great profusion. During the eight weeks (July and August, 1915) which I spent in the Lynton district I obtained fifty-six species and have no doubt that this preliminary list could be greatly increased if any local botanist would take an interest in the group. The similarity of my list with those species found by Dr. Adams in Cornwall is interesting, notably as regards the occurrence of *Physarum nucleatum* Rex in both districts and the rarity of *Comatricha typhoides* Rost. in the West of England. Several species which were common about Lynton appear to be very uncommon in most parts of the country, but until more local lists are published it is difficult to ascertain their true range of distribution.

I am greatly indebted to Miss Gulielma Lister, F.L.S., for her kindness in verifying or correcting all my determinations.

The list of Mycetozoa in *The Victoria County History of Devon* mentions only thirty-four species; those on my list which are not there mentioned are marked with an asterisk *.

Ceratiomyxa fruticulosa Macbr. Very abundant in July, becoming scarcer in August.

Badhamia utricularis Berk. An old development in Lee Woods.

**Physarum psittacinum* Ditm. Three large gatherings on rotten logs in Lee Woods in August.

**P. viride* Pers. Common on stumps.

**P. nucleatum* Rex. On an old stump in West Lyn valley. This is the second British gathering, it having been found by Dr. Adams in Cornwall in 1911. It is recorded from Japan, Java, Borneo, West Indies and U.S.A.

P. nutans Pers. Abundant everywhere.—Subsp. *leucophæum* Lister. Lee Woods and West Lyn valley.

P. cinereum Pers. Lee Woods.

P. sinuosum Weinm. Lynbridge and Wringcliff Wood.

**P. bitectum* Lister. Woody Bay Woods.

**P. conglomeratum* Rost. A small development on dead holly-leaf in Lee Woods.

Fuligo septica Gmelin. Common everywhere.

Craterium minutum Fries. Abundant on sticks and straw everywhere.

**C. leucocephalum* Ditm. Rather scarce. Wringcliff Wood.

**C. aureum* Rost. Plentiful on straw and dead gorse in Wringcliff wood and Woody Bay Woods.

Leocarpus fragilis Rost. Rather common in Lee Woods.

Diderma hemisphericum Hornem. Lee Woods and Ladywell.

**D. effusum* Morgan. Lee Woods and W. Lyn valley.

**D. floriforme* Pers. Three large gatherings amongst oak logs and leaves in Lee Woods. An extremely pretty species, which has only been obtained in a few English localities.

Didymium difforme Duby. Plentiful on decaying vegetation.

**D. dubium* Rost. On dead holly leaves in Lee Woods. A rare species, hitherto recorded only from Lyme Regis, Scotland, and Bohemia.

D. clavus Rost. Wringcliff, Ladywell and Lee Woods.

D. nigripes Fries. Extremely abundant on dead leaves in every wood and hedgerow in the district.—Var. *xanthopus* Lister. An aberrant gathering of this variety at Lynbridge closely resembles *Physarum compressum*.

D. squamulosum Fries. Plentiful everywhere on wood and leaves.

**D. melanospermum* Macbr. East Lyn valley and Lee Woods.

**D. crustaceum* Fries. Large developments on dead leaves and herbage beneath a big lime tree in Lee Woods. It is only recorded from Devon, Dorset, Hants, N. Wales and Poland.

Mucilago spongiosa Morgan. On grass by roadside near Woody Bay.

**Colloderma oculatum* G. Lister. Among liverworts on a log, Ladywell. This is an extremely interesting species, new to Devon but recently found in Essex, Beds., Worcs., and Herefordshire, as well as in Scotland, Austria, U.S.A., and Japan. The outer layer of the sporangium wall is gelatinous and swells when moist. It is a minute species and not easy to detect when mature.

Stemonitis fusca Roth. Plentiful on rotten wood.

**S. splendens* Rost. var. *flaccida* Lister. Lee Woods. This gathering matured indoors from greenish-yellow plasmodium.

**S. herbatica* Peck. Woody Bay Woods. Scarce.

**S. ferruginea* Ehrenb. Lee Woods. New to Devonshire.

S. flavogenita Jahn. Lee Woods and Woody Bay.

**Comatricha nigra* Schr. Plentiful on dead wood everywhere.

**C. elegans* Lister. A very large development on an old log in Lee Woods. Miss Lister writes, "This is the largest British gathering I have seen." It is a scarce species.

**C. laxa* Rost. Large gatherings from Lee Woods, Ladywell, and valleys of East and West Lyn. Not usually considered a common species; I have only once found it previously.

**C. typhoides* Rost. Wringcliff Wood, once only. In the Midlands this is one of the most abundant species in summer.

**C. pulchella* Rost. On dead leaves, Lynbridge and Lee Woods.

**Enerthenema papillatum* Rost. On dead wood in Lee Woods.

**Lamproderma arcyrionema* Rost. Lee Woods. An exquisite little species, the tiny sporangia are iridescent bronze or steel-grey. It is a somewhat rare British species, abundant in America.

L. scintillans Morgan. Plentiful on straw. Wringcliff Wood.

Cribraria argillacea Pers. Wringcliff, Ladywell, Lynbridge and Lee Woods. The plasmodium is steel-grey.

**C. aurantiaca* Schrad. Abundant on dead wood, especially of conifers. The sporangia vary greatly in size and in the length of the stalk. The plasmodium is green.

**Dictydium cancellatum* Macbr. Abundant in Wringcliff Wood.—Var. *fuscum* Lister. On beech stump, Lee Woods.

**Tubifera ferruginosa* Gmelin. Plentiful on a mossy log, Wringcliff.

**Enteridium olivaceum* Ehrenb. var. *liceoides* Lister. On a chip of pine wood, Wringcliff. The clustered spores separate this variety from *Licea flexuosa* which it greatly resembles in form.

Reticularia lycoperdon Bull. Common on logs and gateposts.

Lycogala epidendrum Fries. Very plentiful on rotten wood. The young æthalia are coral-red and very conspicuous.

Trichia persimilis Karst. Lee Woods, Woody Bay, Ladywell.

T. varia Pers. West Lyn valley.

T. decipiens Macbr. Everywhere very abundant.

T. botrytis Pers. Lee Woods and Woody Bay.

Arcyria denudata Sheldon. Lee Woods and Ladywell. A very handsome crimson species, common everywhere in Britain.

**A. cinerea* Pers. Common in all woods.

**A. pomiformis* Rost. Woody Bay Woods.

A. incarnata Pers. Everywhere abundant in July, scarcer in August. Very beautiful when mature.

**A. nutans* Grev. Lee Woods, W. Lyn valley. The long yellow sporangia resemble miniature loofah sponges.

A STUDY OF BARBAREA VULGARIS R. Br.

By A. Bruce Jackson.

For several years I have made a critical study of the British species of *Barbarea*. Recently in this connection I have given special attention to the variations of *B. vulgaris* R. Br., and I propose to present some observations on this, the most widely distributed species in our islands. As the result of comparing carefully numerous living and dried specimens from all parts of Europe, including a very large number of examples from widely separated localities in Britain, I have found it necessary to revise the generally accepted opinion as to the relationship of *B. vulgaris* and *B. arcuata*—plants which, as I shall presently show, have been much misunderstood.

Our plant was described by Linnaeus (Sp. Pl., 660 (1753) excl. vars.) as *Erysimum Barbarea*, and subsequently by Robert Brown* (in Aiton, Hort. Kew. ed. 2, iv, 109 (1812)) who described it as "*Barbarea vulgaris* foliis inferioribus lyratis: lobo terminali rotundato; superioribus obovatis dentatis."

Seven years later, the plant afterwards known to botanists as *B. arcuata* Reichb. was described as a species by Opiz under the name of *Erysimum arcuatum* in J. & C. Presl, Fl. Cech. 138 (1819), with the description "fol. inferioribus lyratis, superioribus pinnatifidis, lobis terminalibus rotundatis, siliquis arcuato-falcatis æqualibus. . . . Flores majores præcedente."

Reichenbach in his diagnosis of *B. arcuata* (in *Flora*, v. 296, 1822) says he was much impressed by finding this beautiful plant in several fields at Dresden, and that he also came across it more sparingly in the neighbourhood of Weimar and Gotha. He distinguishes it by its flowers, twice as large as those of *B. vulgaris*, by its patent branches, arcuate pods, and the form of its leaves. He had previously seen it in a garden under the name *Erysimum Barbarea, fl. pleno*, but had regarded it as possibly a garden state. He cites Sturm, *Deutschlands Flora*, Heft 43, t. 10, as representing *B. arcuata*. He says his plant is Wahlenberg's *Erysimum Barbarea β*, by which he must refer to Wahl. Fl. Ups. 226 (1820), where the plant is thus described: " β Caule ramosiore, siliquis patentibus longioribus. *E. Barbarea*, Smith, brit. p. 706. Sv. Bot. t. 194. Flor. Dan. t. 985."

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* On the question of Robert Brown's authorship of the *Cruciferæ* in Aiton's *Hortus Kewensis* see Journ. Bot. 1912, Suppl. iii, p. 7.

Fries, however, in 1828 (Nov. Fl. Suec. 205) considered Wahlenberg's β, including the figures cited, to be not *arcuata* but a plant intermediate between his var. α *silvestris*—which has " siliquis brevioribus adpressis strictis "—and *arcuata*. He gives the name *campestris* to this intermediate form, altering Wahlenberg's "siliquis patentibus" to "oblique erectis, subpatentibus." Reichenbach therefore, from the description in Fl. Ups. might well think Wahlenberg meant his *B. arcuata*, and indeed Wahlenberg may have included it, for in his Fl. Suec. 417 (1824), he gives Reichenbach's name as a synonym under his var. β.

It seems remarkable that Fries, writing in 1828, should cite *B. arcuata* Reich. in Sturm for his var. γ, for Reichenbach in 1832 (Fl. Germ. Excurs. 683) writes " Rchb. Primit. 1820 nec apud Sturm." I consider this due to the fact that the figure in Sturm matches those cited by Fries for his var. *campestris*, which show the pedicels of the young pods arcuate ascending, whereas Reichenbach's description has " Schoten jung mit den Stiele abstehend bogen förmig aufsteigend, . . ." This agrees with Fries's var. γ and disagrees with the figure in Sturm. Hence it was probably the figure which Reichenbach was repudiating. " Primit. 1820 " would appear from Sturm to be Primit. Sem. hort. Dresd., which I have been unable to see. Fries's reference to M. Bieberstein is to the latter's *Erysimum Barbarea*, which De Candolle cites for his *B. taurica*.

By Grenier and Godron (Fl. France i, 91, 1848) both *B. vulgaris* and *B. arcuata* are regarded as good species, *B. arcuata* being distinguished as follows:

" Fleurs plus grandes, d'un jaune plus vif, en grappes plus lâches; pédoncules, fructifères plus écartés, plus longs, *droits*, de moitié moins épais à la maturité *étalés à angle droit;* siliques *jeunes arquées-ascendantes*, à la fin étalées de tous côtés, longues de 30–40 millm., de moitié moins épaisses, un peu comprimées, toruleuses; style plus mince et plus long; graines plus petites, plus ovales, plus noires: feuilles à lobes plus profondément incisés-crénelés à crénelures plus étroites et moins arrondies."

Subsequently Martrin-Donos (Fl. Tarn, 44, 1864) described a *B. rivularis* as follows:

" Plante de 3–5 décimètres; rameaux fructifères *courts, atteignant* tous à peu près *la même hauteur;* siliques *obliquement dressées* le long des rameaux, et le plus souvent disposées d'un même côté, à point effilée ; fleurs jaunes ; feuilles radicales lyrées, à lobe principal *ovale oblong*, les deux lobes qui le souvent *égalant la moitié de sa largeur ;* lobe principal des feuilles supérieures obovale, comme *tronqué*, *profondément et irregulièrement sinué denté*."

This seems to me nothing more than the plant which Fries had previously described as *B. vulgaris* var. *sylvestris*. I have frequently seen both English and Continental specimens of it labelled *B. stricta* Andrzj. which however is a perfectly distinct species easily separable from all forms of *B. vulgaris* by its shorter styles, hairy flower buds, and other well-marked characters.*

The plant which Boreau describes as *B. stricta*, which according to Rouy and Foucaud does not occur in France, is apparently from the description, *B. vulgaris* var. *sylvestris*. Boreau says : "Très resemblante a la précédente [*B. vulgaris*] mais plus grêle, lobes latéraux des feuilles cordiforme, oblong ovale, feuilles intermédiaires lyrées incisées à la base, les supérieures obovales sinuées dentées : fleurs jaunes, plus pétites, siliqués subulées, serrées contre l'axe." This I think leaves no doubt as to the plant intended.

Another form of *B. vulgaris* which has misled more than one botanist,† is var. *transiens* Druce (Fl. Berks. 44, 1897) : this has the upper stem leaves more divided with linear lateral lobes, somewhat resembling those of *B. intermedia* Bor. with which it has been confused.

Turning now to British authors, Babington in the first edition of his *Manual*, p. 19 (1843), keeps up *B. arcuata* as a species distinct from *B. vulgaris*, recording it from Llangollen, N. Wales, on Mr. Borrer's authority.‡ He distinguishes it by its lax flowering raceme and small oblong seeds, the latter being described as scarcely half the size of those of *B. vulgaris*, and with a truly accumbent radicle, whereas in *B. vulgaris* the radicle is said to be pushed from its place so as to be nearly on the back of one of the cotyledons. In the second and two subsequent editions we find a difference of treatment, *B. arcuata* being reduced to a variety of *B. vulgaris* with the description "young pods patent upon nearly horizontal pedicels." In the fifth edition (1862) *B. arcuata* is not mentioned, but the pods of *B. vulgaris* are described as adpressed, obliquely erect, or patent : this was evidently meant to include *B. arcuata*. In the sixth and succeeding editions Babington says that he cannot separate *B. arcuata* from *B. vulgaris*. In the *Student's Flora* (1870) Sir J. D. Hooker treats *B. arcuata* as a subspecies of *B. vulgaris*, with the following description : "Raceme elongate, petals rather more than twice the length of the sepals, pods in a lax raceme, arched and spreading when young, 5–8 times as long as their pedicels ; seed more than twice as long as broad. In the second edition of the *Flora*, *B. arcuata* is reduced to a variety of *vulgaris* with the same description and mentioned as rare, Loughgall, Armagh, being given as a locality.

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* See note by J. G. Baker in Phyt. n.s. i, 327 (1856).

† See Wats. Exch. Club Rep. 1909–10, p. 219, and 1912–13, p. 377.

‡ I have seen a specimen from this locality in Borrer's herbarium at Kew : it is typical *B. arcuata*.

Syme (Eng. Bot., ed. 3, i, 172 (1863)) distinguishes the true *B. arcuata* Reichb., which he regards as a subspecies of *B. vulgaris*, by the shape of the seed which is said to be twice as long as broad as compared with as long as broad in *B. vulgaris*.

It will be seen from the descriptions I have quoted that hardly any two authors agree as to what, beside the direction of the pedicels and pods, may be considered as essential characters of *B. vulgaris* and *B. arcuata*. Most British botanists after Syme seem to have assumed that *B. arcuata* of Reichenbach was something different from the plant commonly so named in this country, and have relied almost entirely on the seed character mentioned above, for distinguishing it. Mr. Druce, for example (Rep. Bot. Exch. Club, 1906, 210), emphasises this point in a note on a plant collected by Mr. Bickham from a ditch at Upton-on-Severn, Worcester, which he refers to *B. vulgaris* var. *decipiens ;* he inaccurately describes the seeds as broad and short, whereas on a careful examination I find most of them to be at least twice as long as broad, which should make it the true *B. arcuata* according to Syme. As a matter of fact, I have found the size and shape of the seed vary to such an extent in all the specimens of *B. vulgaris* I have examined as to make this character of little or no value for distinguishing *B. arcuata*. Moreover, Reichenbach himself makes no mention of this seed character in any of his descriptions of the plant in question. Syme may have obtained this character from Reichenbach (*Icon. germ.* ii, 14, 4357 (1837)—"Semina videbis eximie oblonga in speciebus affinibus brevia angulata"—where they are thus figured, but in Sturm the figure shows some short and some long, and I am convinced that anyone who will take the trouble to look at a sufficiently large series of specimens will find that not only the shape and size of the seed, but the characters based on leaf-cutting, density or laxity of inflorescence, size of flower, direction of young and mature pods, are not permanent, but vary in almost every specimen examined and sooner or later break down if we attempt to correlate them.

We are thus forced to the conclusion that *B. arcuata* has no real existence as a species but belongs to a series of forms to which the names *B. arcuata*, *B. taurica*, *B. vulgaris* var. *divaricata*, and *B. vulgaris* var. *decipiens* have at various times been applied. It is interesting to note that Fernald, from whose useful paper on the North American Barbareas (*Rhodora*, 1909, p. 134) I have derived much assistance, has independently arrived at the same conclusion ; he says: "*B. arcuata* is often separated, at least varietally, by the slightly larger flowers which are more loosely arranged in anthesis, the slightly arcuate and more slender siliques, and the narrower seeds ; but in the American specimens examined these characters do not seem sufficiently marked to make it clear that we have two different plants." "If separation be maintained," he adds in a note, "the name *B. taurica*, which was published in the preceding year, will have to be used."

The plant published as *B. taurica* (D. C. Syst, ii, 257) from the description seems undoubtedly *B. arcuata* Reichb. De Candolle cites as a synonym "*Erysimum Barbarea* M. Bieb. fl. taur. 2, p. 116, ex Stev." I have been unable to find any mention by Steven of this plant, but the South Russian specimens which I have seen are all *arcuata*, and the reference is therefore probably correct although there is nothing in Bieberstein's description to distinguish his plant from *E. Barbarea* L. It is referred to var. *arcuata* by Fries, and the identity does not seem to have been disputed. The name *taurica* is, however, itself antedated by *Erysimum arcuatum* Presl. (Fl. Cech., 138, 1819).

The following arrangement of the British forms appears to be the most natural and satisfactory which can be adopted: it follows that of Fries in the work already cited, and that which will be adopted in *The Cambridge British Flora*. The localities cited are in every case those from which I have seen specimens.

BARBAREA VULGARIS [R. Br. in] Aiton Hort. Kew. ed. 2, iv, 109 (1812).

Erysimum Barbarea L. Sp. Pl. 660 (1753) excl. vars.
E. lyratum Gilib, Fl. Lituan. ii, 59 (1782) (nomen abortivum).
B. lyrata Aschers. Fl. Brandenb. i, 35 (1864).

Biennial or perennial, dark shining green. Stem erect, angular, branching above, sometimes purplish at the base, glabrous or slightly hairy * up to about 8 dm. high. Radical and lower leaves pinnately cut, terminal lobe much the largest, elliptic-oblong or suborbicular, entire or undulate in margin, occasionally subcordate at the base; lateral lobes in 2–4 pairs, oblong-elliptic or linear, upper pair together equalling or exceeding the terminal lobe in width, or occasionally all the lateral lobes small or absent. Lower stem-leaves auriculate, upper ones obovate or elliptic, irregularly toothed or lobulate, or almost entire. Flower-buds glabrous. Flowers variable in size. Petals bright yellow, 4–8 mm. long. Pods variable in direction, erect or more or less spreading, 1·2–2·5 cm. long, on pedicels 3–4 mm. long, tapering to a slender style 1·5–3 mm. long. Seeds ovoid to oblong, 1–1½ mm. in greater diameter.

VAR SILVESTRIS Fries, Nov. Fl. Suec. 205 (1828); *B. stricta* Boreau, Fl. Centre ed. 3, ii. 39 (1857), non Fr. excl. syn.; *B. rivularis* Martr.-Don. Fl. Tarn. 44 (1864); *B. vulgaris* sub-sp. *eu-vulgaris* Syme, Eng. Bot. ed. 3, i, 171 (1863) (partim); *B. vulgaris* race *rivularis* Rouy & Fouc. Fl. Fr. i, 198 (1893).

Exsiccata. Billot, 3011 (as *B. stricta*).

Plant usually small, with solitary stems. Lateral lobes of lower leaves, very small or wanting. Pods short, about 12 mm. long, appressed.

Dry roadsides, field borders. Not often recorded though possibly not uncommon.

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* Plants with slightly hairy foliage have been named *B. hirsuta* (Weihe, apud Reichb. Fl. Germ. 682 (1832)), but some of the specimens issued as this in Reichenbach's *exsiccata* (no. 679) have glabrous or glabrescent foliage.

S. Devon. Exmouth, 1916. *E. W. Hunnybun.—Dorset.* Corfe Castle, June, 1852. Borrer (Herb. Borrer).—*N. Hants.* Between Odiham and Winchfield Station, 1894. *C. E. Palmer.* —*W. Kent.* Borders of fields near Beckenham, 1892. *E. de Crespigny.—Surrey.* Battersea, 1851. Chalk-pit near Dorking, 1916. *A. J. Wilmott.—Middlesex.* Cultivated field between Isleworth and Twickenham, 1916.—*Herts.* Wellen and Hatfield, 1875. *T. B. Blow.* Purwell, Hitchin, 1915. *J. E. Little.—N. E. Yorks.* Clifton Ings, June, 1852. *J. G. Baker* (Herb. Watson).

Ireland. Roadside, Loughbrickland, Co. Down, 1894. *H. W. Lett.* Cottage yard, canal side, Straffan, Co. Kildare, 1905.

The British examples which I have placed under this variety are not so extreme as Billot's No. 3011, and vary somewhat in the direction of var. *campestris* Fr.

VAR. CAMPESTRIS Fr. Nov. Fl. Suec. 205 (1828). *B. sylvestris* Jord., Diag. 100 (1864); *B. vulgaris* sub-sp. *eu-vulgaris* Syme, l. c. partim; *B. vulgaris* R. Br. race *vulgaris* Rouy & Fouc., Fl. Fr. i, 197 (1893).

Icones. Sturm, Deutsch. Fl. heft 43, t. 10 (1823) (*B. arcuata*); Fl. Dan. t. 985 (1792) (*Erysimum Barbarea*); Reich. t. 4356 (1837) (*B. vulgaris*); Svensk. Bot. iii, t. 194 (1804) (*E. Barbarea*); Dietrich. Fl. Boruss. vi, t. 421 (1838) (*B. vulgaris*); Zenker Fl. Thuringen, t. 1215 (*B. vulgaris*).

Exsiccata. Reichb., 678 (*B. vulgaris*); Billot, 2213 (*B. vulgaris*).

Plant robust, pods usually longer, up to 25 mm., obliquely erect or slightly spreading.

This is the form most frequently met with in Britain and appears to be equally common on the Continent. It is connected by intermediates with var. *silvestris* on the one hand and with var. *arcuata* on the other. According to Fries it is the plant always figured by the old herbalists. It is the *B. vulgaris* of De Candolle's Syst. ii, 206, where very full references to the early authors are given.

Var. ARCUATA Fr. Nov. Fl. Suec. 205 (1828); Neilr. Fl. N. Ost. 730 (1859); *Erysimum arcuatum* J. & C. Presl. Fl. Cech. 138 (1819); *B. taurica* D.C. Syst. 2, p. 207 (1821); *B. arcuata* Reichb. in Flora v, 296 (1822); *B. vulgaris* subsp. *arcuata* Syme, Eng. Bot. ed. 3, 172 (1863); *B. vulgaris* race *arcuata*, Rouy & Fouc., Fl. Fr. i, 198 (1893); *B. vulgaris* forma *divaricata* Trimen & Dyer, Fl. Middx. 29 (1866); *B. vulgaris* var. *decipiens* Druce, Fl. Berks. 44 (1897).

Icones. Syme Eng. Bot. i, t. 121 (1863) (not typical; pods too short and representing more nearly the var. *brachycarpa* R. & F.); Reichb. t. 4357 (1837); Zenker Fl. Thuringen, t. 1211.

Exsiccata. Reichb. 1963! Billot 3315.

Inflorescence often laxer. Pedicels patent. Pods, arcuate ascending, spreading at right angles to the axis, or even deflexed.

Sub-var. *brachycarpa* mihi. *B. vulgaris* race *arcuata* β *brachycarpa* R. & F. *loc. cit.* Pods short, valves often only about twice as long as the pedicel, and twice as long as the style; often partly sterile.

Glamorgansh. On colliery *débris.* Glais (1908). *A. Ley.**—*Middlesex.* Thames side between Kingston Bridge and Hampton Court, 1912. *C. E. Britton.*

Ireland. Waste ground, Straffan, Co. Kildare, 1904.

Not uncommon, especially by stream-sides and in shady places, but showing a tendency to pass by every gradation into the var. *campestris* Fr. Frequent on the Continent.

Var. TRANSIENS Druce, Fl. Berks. 44 (1897).

Plant stout, robust; lower stem leaves with oblong, cuneiform terminal lobe, the lateral linear lobes well developed, up to five pairs, exceeding the terminal lobe in width. According to Mr. Druce this is a plant of dry situations, occurring on stiff clay soils and barren ground.

N. Somerset. Field border on the Welloway, three miles from Bath, 1910. *J. W. White.*—*Bucks.* Bulstrode. *Druce.*—*Suffolk.* Nazeland, 1896. *J. D. Gray.*—*York.* Clifton Ings, 1871. *E. C. Hunt* (*Herb. Kew.*).—*Salop.* Shrewsbury, 1835. *Leighton* (*Herb. Mus. Brit.*).—*Anglesey.* Banks of Pentraeth river. *Davies* (*Herb. Mus. Brit.*).

Mr. Druce also records it from near Chellow, Englefield, Newbury, and Benham, Berks., and a similar form was gathered in Hayling Island by Mr. Arthur Bennett. (See Rep. Bot. Exch. Club, 1892, p. 353.)

Barbarea vulgaris, in one or other of its forms, is found by riversides, brook-banks, in ditches and moist hedge-bottoms, on dry roadsides, in waste ground, and field borders on stiff clay soils in every English county except South Lincoln, and in all Scotch counties except Westerness, East Ross, Outer Hebrides and the Shetlands. It is frequent throughout Ireland, being recorded from every county division. It ascends to 540 metres on the Grampians of the Atholl district of Perthshire. It is generally distributed over Europe, occurring also in West Asia and the Himalayas. In America it is found only as an introduced plant in the Eastern States. The records of *B. vulgaris* from Kamtschatka, China, and S. Africa refer probably to other species.

I have to thank Mr. Charles Bailey for the loan of a fine series of specimens from his extensive herbarium, and also Mr. A. J. Wilmott for many helpful suggestions.

THOMAS WAINWRIGHT

(1826–1916).

NORTH Devon has lost a local celebrity by the death at Barnstaple on April 29th last of the Librarian and Secretary of the North Devon Athenæum, in the 91st year of his age. Born at Leeds on April 7th, 1826, and educated as a boy in that city, Wainwright, after a brief and uncongenial apprenticeship in a commercial house there, left Leeds before his 20th year to take the post as a junior master in a school at Ryton, near Newcastle; he subsequently moved to a college at Stoke Newington. While at the latter place he matriculated as a student in the University of London in the year 1849, being placed in the first division at the pass-examination. During the sessions 1850 and 1851 he attended lectures in the schoolmasters' class at University College in Latin, Greek, Mathematics, and Natural Philosophy including Astronomy; at his last public examination in Greek he obtained a certificate of honour.

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* Identified as *B. taurica* DC. by Mr. J. R. Drummond (see Bot. Exch. Club Rep. 1907, p. 273, and Wats. Exch. Club Rep. 1908–9, p. 174).

During a term of fourteen years Wainwright carried on a private boarding school at Bridport in Dorsetshire, where he became a member of the town council. He catalogued, arranged, and translated the valuable old manuscripts in the municipal archives of Bridport, and was regarded as an authority on all matters of local history.

In 1865 he left Bridport and in the following year took over a similar school at Barnstaple; in 1872 he was appointed head master of the ancient Grammar School there, which position he held until his appointment in 1893 to be the librarian and secretary of the North Devon Athenæum in the same town. This last position exactly suited Wainwright's tastes and abilities, as a scholar, antiquarian, and botanist; he devoted himself to study, research, and field-botany. He was a member of the Barnstaple School Board during the latter half of its existence, and took an active and successful part in averting what he considered the danger and in avoiding the expense of a board school in the town. In 1900 he published a corrected and enlarged reprint of the "Barnstaple Records"; in 1903 he edited and published the Barnstaple Parish Register, 1538 to 1812. His principal fame rests on the wealth of his antiquarian knowledge and his expert skill in reading and translating ancient manuscripts. He spent much time and labour in copying the registers of many parishes in the district, the incumbents of which severally entrusted them to him for that purpose. Always accessible at the Athenæum he was ever ready and willing to place his wide knowledge and deep learning at the service of students and inquirers, and so became the recognised source of information and general referee in local matters, botanical or antiquarian. He was responsible to a great extent for the inauguration and continuance of weekly botanical walks in various parts of North Devon, which during many years are considered to have proved a delightful means of instruction to a band of enthusiastic students. He was the discoverer of *Hypericum undulatum* Schousb. in North Devon (see Journ. Bot. 1875, p. 296). He was an occasional contributor to this Journal, sending short notes on *Matthiola sinuata* R. Br. (Journ. Bot. 1900, 230), and on *Linaria arenaria* (Journ. Bot. 1907, 451; 1914, 310). For many years up to 1909 he was the official observer for phenological observations of plants in the Barnstaple district, for the Royal Meteorological Society.

Though born of nonconformist parents and baptised in a nonconformist chapel (May 28th, 1826), Wainwright early came under the influence of Dr. Hook, then Vicar of Leeds, and joined the Church of England. He married in London, May 26th, 1852, Miss Julia Durieu, who died at Barnstaple, December 15th, 1906, in the 79th year of her age; by her he had four sons and five daughters, of whom one son and four daughters survive.

W. P. Hiern.

SHORT NOTES.

Sempervivum arachnoideum. — I have been watching for several months a small pot of the Spider's-web House-leek on a sheltered window-sill which gets practically no rain, but plenty of sun. When it rained heavily and the air was saturated with moisture the rosettes, amply furnished with a white network of long hairs, shrank in size — one decreased from 30 mm. to 20 mm. in diameter; but soon after the sun appeared the leaves expanded again. It is generally supposed that the leaves of the rosettes point directly upwards and are bound together by the "cobwebs" to allow the sunlight to fall obliquely on their surfaces; or, in other words, that this is an adaptation tending to reduce the loss of water given off by the leaves. So this behaviour of *S. arachnoideum* in captivity is interesting. When the plant grows in quite shady places, the network is usually much less pronounced, and instead of being white the rosettes are green. This again supports the view that the cobweb hairs are developed to lessen the danger from evaporation. Fraulein Dintel of Vienna has shown that the cobwebs of this plant are modified glandular or secretory hairs, and that it is their secretion which forms the means by which they are bound together into a web. There is an excellent photograph of the rosettes of *S. arachnoideum*, and two showing "the migration" of *S. montanum*, in Dr. Newell Arber's most useful book, *Plant Life in Alpine Switzerland*.—H. S. Thompson.

Sedum dasyphyllum.—On May 16th I gathered on a wall near Portishead two pieces in small bud, and left them, without roots and with no water, on a table in a room facing S.E. In about three weeks the top bud of each had expanded and showed the stamens; and to-day (June 13th) they are as fresh as when gathered. Mr. J. W. White (*Fl. Bristol*, 323) quotes the late David Fry as saying that this plant "survives sometimes in a surprising way when a wall is repaired or repointed, coming out again apparently through the hard mortar."—H. S. Thompson.

Caterpillars and Oaks. — With reference to what has appeared in the public press relative to the devastation caused by caterpillars to the oak trees at Ashtead, you may be interested to know that some three or four years since a similar occurrence took place in the oak plantations in Richmond Park. The denudation of the trees was so severe that in the spring of 1913 H.M. Office of Works consulted Mr. Maxwell Lefroy, the entomologist of the Royal College of Science, with a view to stamping out the pest. Eventually it was decided to spray the trees with chromate of lead at such a time that the young caterpillars, on hatching out, should have only poisoned food. The spraying operations were carried out by portable high-pressure pumping apparatus, self-supporting telescopic ladders being provided to reach the tree-tops some forty feet from the ground. This was, I believe, the first occasion on which attempts were made to spray such large trees, and there is not much doubt that the oaks at Ashtead could be treated in a similar manner. It is, of course, now too late in the season to undertake preventive measures, but if spraying were undertaken early next May, I have not much doubt that the pest could be eradicated.—J. COMPTON MERRYWEATHER.

CONVALLARIA MAJALIS, L. — In Martyn's edition of Miller's *Gardener's Dictionary* there is a note under the description of this plant as follows: "There are several varieties of the Lily of the Valley . . . a fourth with reddish or red flowers; this, Mr. Miller affirms, continued the same above forty years: the flowers are smaller, the stalks redder, and the leaves of a darker green than in the common sort." No localities are stated. In May, 1872, I accompanied Mr. F. J. Hanbury in an excursion to the Quantock Hills, and in a woody combe not far from Stogumber we found *Convallaria majalis* with rose-coloured flowers, in some quantity. My specimens do not differ materially, except in colour, from the ordinary form, though the leaves are perhaps narrower than usual. Whether or not the nature of the soil influences the colour may be doubtful, but the soil in which the Convallaria was growing, and of all the land thereabout, was a dark red. In Farley wood, near Winchester, flowers of this plant "stained with dull red or crimson at the bottom," have been noticed: see Townsend's *Flora of Hampshire*, p. 431, 2nd edition. The soil there would be chalk. — FREDERIC STRATTON.

FORFARSHIRE PLANTS.—Early in last July Mr. and Mrs. R. H. Corstorphine kindly showed me many interesting plants in v.c. 90. The following are, I believe, new records: *Hieracium duriceps* F. J. Hanb. Rocks by the River Isla, Den of Airlie. *Salix aurita* × *viminalis*. Swampy thicket, Ochterlony Bog, near Guthrie; confirmed by Rev. E. F. Linton. *Carex Œderi* Retz., var. *cyperoides* Marsson. Boggy ground, Sands of Barry; a very pretty, small form, much like specimens of mine, determined by Kükenthal. Mr. Arthur Bennett agrees.—EDWARD S. MARSHALL.

CAREX RARIFLORA ON BEN LAWERS?—Is it not most likely that the plant recorded under this name by Mr. Cumming (p. 145) was *C. atrofusca* Schkuhr (*ustulata* Wahlenberg), which does occur on that mountain, and on two others, not very far away? There is a considerable resemblance between these two species, especially when young. *C. rariflora*, though decidedly local, is usually abundant where it does occur; whereas *C. atrofusca* seldom flowers at all plentifully in its few known British stations. —EDWARD S. MARSHALL.

Potamogeton decipiens in N. America.—Looking through the lucens specimens of the world in connection with a *Potamogeton* possibly unrecorded for Great Britain, I saw a specimen of *P. decipiens* Nolte labelled "Lake Ontario: One Thousand Islands. H. C. Hart." The leaf-bases are quite clasping, the peduncle is five and a half inches long and the spike one and a half long. As the United States Boundary seems to touch the shore at Wolf Island and Cape Vincent, it would seem the above record belongs to Canada. The only records I know of for the plant outside Europe are, "Nynee Tal, India. 5. 1845, *Griffith*" in Herb. Kew," and "Pl. Altaicæ. *Dr. O. Duhumberg* 1881" in Herb. Buchenau at Bremen.—Arthur Bennett.

REVIEW.

The British Mycological Society. Transactions for the Season 1915. With two plates (one coloured). Edited by Carleton Rea. Published the 4th May, 1916. Worcester: Ebenr. Baylis and Son, 22, The Cross. Vol. v, part 2, pp. 187–350. Price to non-members, 10*s.* 6*d.*

These Transactions steadily increase in importance and interest, and we are inclined to think the part before us the best that has yet appeared. The list of contents, which by the way seems arranged in inverse ratio to their importance, shows considerable variety. New or rare British fungi are described by Mr. J. W. Ellis, Miss Lorrain Smith (microfungi), and the editor: Mr. G. K. Sutherland describes a new genus—*Lulworthia*, apparently named from Lulworth, Dorset, where it was found—of Marine Pyrenomycetes, and two new species, *Rosellinia laminariana* and *Pleospora laminariana*: Miss Lister enumerates the 47 species of Mycetozoa found in the Gower Peninsula in 1915 during the Swansea Foray, of which, and of the Spring Foray at Baslow, Derbyshire, the editor gives an account.

The most important contributions to the volume are those of Mr. Ramsbottom: they include a list of the British Phycomycetes with a key to the genera, which might well be reprinted as a hand-list for collectors; the notes on special genera and species and a general sketch of the history of the classification of the group show a comprehensive and accurate knowledge both of early and recent literature; his paper on "Colour-Standards" is of interest to others than mycologists and we rather regret that it did not appear in some publication more generally accessible.

Mrs. Rea, the President of the Society for the year, delivered in that capacity an address on "Fungus Illustrations," which is here printed. Herself a practised portrayer of fungi—she mentions that she has already "painted over fifteen hundred drawings of British Fungi, and many of these include additions to the British Flora"—the subject naturally presented special attractions, and she has compiled a list of works in which fungi have been figured, arranged chronologically under the names of their authors. It contains much information and has evidently involved considerable research; but Mrs. Rea's style, as may be gathered from the sentence quoted above, leaves a good deal to be desired: it is to be regretted that her paper was not submitted to a friendly critic before it was sent to press, as it would be greatly improved by condensation: much that comes quite naturally in a spoken address is out of place in a permanent record.

The critical remarks on various authors, while doubtless conveying (though at times somewhat obscurely) Mrs. Rea's estimate of their work, are, we think, themselves open to criticism: she hardly shows the impartiality which one expects from a critic when she says of M. Boudier's *Icones*: "They are simply magnificent, and I speak more feelingly of them because their author is our friend, and the reproductions, though good, are not a tithe of the originals"—the ambiguity of the last remark is characteristic of Mrs. Rea's style. She seems imperfectly acquainted with Mr. Worthington Smith's work, as no reference is made to the two sheets representing respectively edible and poisonous fungi, published many years since by Hardwicke, nor to figures in the volume on "Eatable Funguses" (itself omitted by Mrs. Rea) edited by R. Hogg and G. W. Johnson in 1866, to which Mr. Smith contributed the figures. Her appreciation of the admirable series of original drawings in the public gallery of the Department of Botany seems to us very inadequate: "they suggest to my mind," she says, "a compilation, and not what we see in the field," but we believe that practically all were drawn from living specimens.

The typography of the Transactions is good, but its arrangement is open to improvement—*e. g.* the title of a book should be printed either in italics or in quotes, to distinguish it from the text, and the very black headings to the papers and in the list of Phycomycetes are unpleasing; the wrapper-title-page is very ugly. The pages have no headings—it is strange that what almost seems a providential arrangement for facilitating reference should be overlooked—but in this respect Mr. Rea may cite the example of the Kew *Bulletin*, which from the first has ignored this aid to consultation. The printing is on the whole accurate and highly creditable to a firm presumably not accustomed to undertake scientific work; there are however errors, the funniest of which is "fakirs" for "fakers," for which we are sure Mr. W. G. Smith, who is quoted as having used the term, is not responsible.

The volume as a whole is highly creditable to the Society, and shows a gratifying advance in the study of groups of plants which have in the past been somewhat neglected.

BOOK-NOTES, NEWS, &c.

At the meeting of the Linnean Society on June 1st, Mr. James Groves gave a demonstration of "New Types of Fossil Characeæ from the Purbeck Beds." He referred to the curiously isolated character of the *Characeæ*, which exhibit no clear affinities with any other group of plants, and to the consequent interest attaching to any light which could be thrown on their past history. After enumerating the earlier formations in which plant-remains conjectured to belong to ancestors of the group had been found, he stated that the earliest known remains of undoubted *Characeæ* were detached fruits recorded from the Lias and Oolite, the earliest remains of the vegetative parts being those in the Middle Purbeck beds. He explained that by Mr. Reid's method of subjecting slices of the limestone, in which the plants were found, to a prolonged drip of very slightly acidulated water, so that the Chara-remains were etched out, they had been able to elicit much fresh information as to structure, which had not been obtainable from the sections and polished surfaces of chert. Some lantern-slides and a large number of photographs taken by Mr. Reid were exhibited with especial reference to the prevalent type of Characeous plant which had recently been described by Mr. Reid and himself as a new genus, *Clavator*. The principal characteristics of this were: the constant number of the cortical tubes (12), the remarkably swollen stem-nodes developed in a peculiar manner, the production of symmetrical rosette-like groups of small clavate processes on the stems and branchlets, and the presence of an utricle enveloping the oospore and formed or surrounded by a number of elongated adnate cells, all of which characters represented important divergencies from any existing type of Characeous plant. Reference was made to other types which had not yet been worked out, especially to a large one of which casts only had been found and a minute one evidently belonging to the section *Nitelleæ*, but presenting important points of difference from existing forms.

At the same meeting Prof. Julius MacLeod, University of Ghent, gave an account of his paper on "Quantitative Variation in certain Diagnostic Characters of ten Species of the Genus *Mnium*." He asked whether it was possible to describe and to identify an animal or a vegetable species by means of numbers representing the value of the specific characters? He had tried to realise this by measuring thirty-eight characters in about ninety species and twenty varieties of the genus *Carabus*, and to carry out similar work with mosses of the genus *Mnium*, limiting himself to the study of the leaves of the fertile stem of ten species of that genus. When we measure, for instance, the length of the successive leaves from the base to the summit of a fertile stem of a *Mnium*, we see that the length increases up to a maximum and then diminishes. This curve represents the variation of the character under consideration along the axis. This peculiar form of variation may be called *gradation*. It is something quite different from variation properly so called. The gradation of the measured characters of the ten species shows much diversity. In these examples it is possible to find the name by four characters; of course we may often be compelled to make use of five or more characters. As we have at our disposal a dozen characters, we may hope that the identification of a given specimen will be always possible, even if the species were more numerous.

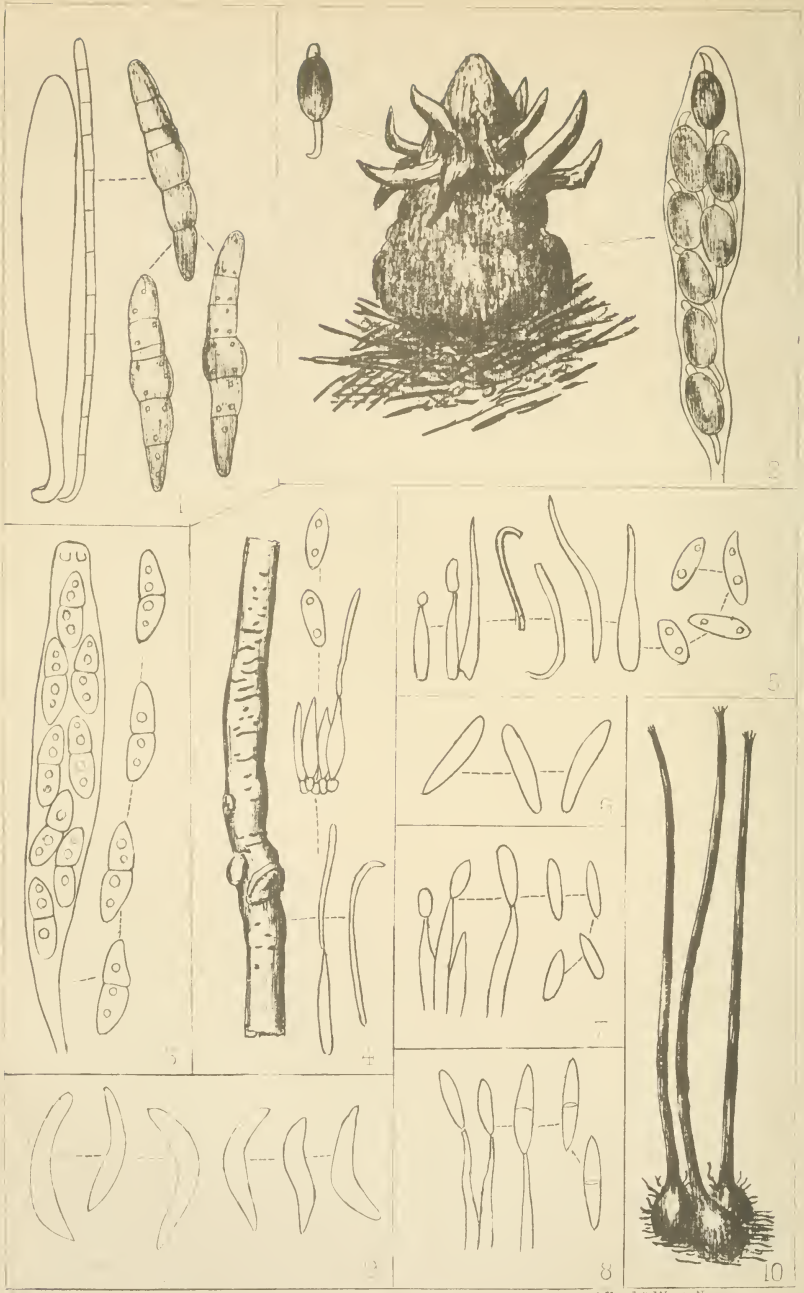
On the same occasion Dr. Daydon Jackson communicated a note from Miss Louisa Pershore, of Torquay, stating that *Mimulus moschatus* had been observed by her for several years as growing and increasing in running water near Sticklepath, in the neighbourhood of Okehampton, on the borders of Dartmoor. Sir David Prain remarked that this plant in cultivation seems to have quite lost its original musky scent, and that it would be interesting to know if this escape had retained it.

In connection with the recent twenty-first congress of the South-Eastern Union of Scientific Societies, which was held at Tunbridge Wells where the Union originated, a hand-book, entitled *Tunbridge Wells and Neighbourhood*, has been published (Pelton, Tunbridge Wells, price 2*s.* 6*d.*) under the editorship of Mr. H. R. Knipe. Besides interesting chronicles of the town and some archæological matter, all branches of natural history are dealt with. In the portion devoted to Palæontology the editor alludes to the Weald-Clay flora: the fungi recorded from the neighbourhood are enumerated by Mr. W. T. Trollope, the flowering-plants (without localities) and noteworthy trees by Mrs. Stebbing, with a popular sketch of the flora of the seasons by Mr. F. Roberts, the Mycetozoa by Mr. W. E. Nicholson, and the plant-galls by Mr. R. R. Hutchinson. Mrs. Stebbing notes that the late Dr. Gilbert's collection of *Rubi* has been presented to Kew.

The recently issued part (5th S. i. part 3) of the *Icones Plantarum* contains figures and descriptions of the following new genera: *Pappobolus* Blake (Compositæ, Helianthoideæ); *Dalzielia* Turrill (Asclepiadaceæ Marsdeneæ); *Chloachne* Stapf and *Uranthœcium* Stapf. (Gramineæ Paniceæ); *Danthoniopsis* Stapf (Gramineæ Arundinelleæ); and also of *Mischopleura* Wernham (Ericaceæ Rhodoreæ ?); *Neowollastonia* Wernham (Apocynaceæ Plumericæ): *Eriolopha* Ridley (Zingiberaceæ, Zingibereæ). These latter and numerous new species are cited from "Trans. Linn. Soc. Ser. 2, vol. ix ined.," but as that volume has not yet appeared the publication of all must date from their appearance in the *Icones*—a fact likely to create confusion among future workers. Many of the novelties form part of the valuable collection made on Dr. A. F. R. Wollaston's expedition to Dutch New Guinea in 1912–13, a grant to the expenses of which was made by the Trustees of the British Museum: the study-set of these is in the Department of Botany.

The Report for 1915 of the Botanical Society and Exchange Club of the British Isles contains, in addition to the usual number of records of casuals, new combinations and autobiographical reminiscences, much of genuine interest. As to the latter, it is useless to remonstrate with Mr. Druce, but we do not think that even he has ever done anything more unjustifiable than the restoration of *Benthamia*—expressly excluded, though he does not mention this, by the list of "nomina rejicienda" appended to the Rules of the Vienna Congress—in place of *Amsinckia*, and creating 21 new combinations without any indication that even one of the transferred species has been examined by the combiner. The Report is as usual largely egocentric: it is, Mr. Druce tells us, his "own compilation" and carries with it only his "personal authority," adding that "all rights in its publication are reserved"—a *caveat* somewhat ungenerous and unscientific, especially as he himself has not hesitated to select from this Journal such information as he thinks it desirable to convey to his readers. Incidentally it is to be regretted that more care has not been taken in transcription: *e. g.* the statement that *Hypericum calycinum* was "found by T. Brewer in 1730 at Bradford, Wilts"—S. should be substituted for T. and Yorks for Wilts; we note too that to this and other items "Editor" is attached—it is not easy to see why this substitution is made, as the communications so indicated are signed by the writer in the Journal. Our notice of Henry Peirson was presumably overlooked, as no reference is made to it and the name is misspelt "Pierson." Perhaps the most interesting note is that on *Lycopodium complanatum*, in which Dr. H. Takeda, who has been working at the genus, states that the plant originally recorded and figured in this Journal (1882, 321, t. 233) under that name, and subsequently regarded as a form of *L. alpinum*, really represents that species. The plant has long since disappeared from its original locality in Woodchester Park, where it only occurred in small quantity, but Dr. Takeda has identified specimens from several localities as *L. complanatum*. There is much matter worthy of note, some of which suggests criticism, but as no copy of the Report has reached us for notice we must content ourselves with calling attention to its appearance. We had hoped to find some information as to the constitution of the "Botanical Society," of which Mr. Druce is not only the "sole begetter" but apparently the only official.

Some very interesting "Fragments de Bryologie Ibérique' (*Brotéria*, Serie Botanica, vol. xi (1913), pp. 135–143, and vol. xiii (1915), pp. 149–157) are the outcome of the Rev. A. Luisier's bryological explorations in Spain and Portugal, and they fall under eight headings:—(1) The genus *Triquetrella* in Europe. *T. arapilensis* is a Spanish species of a genus hitherto found only in Australasia, South Africa, and Patagonia. The plant is described and figured. (2) *Bruchia vogesiaca* Schw. in Portugal—a very rare species recorded from three or four stations only. (3) *Didymodon Ehrenbergii* Kindb. (*Trichostomum* Lorentz). This is another rarity; to its previous stations—Sinai and Marseilles—is now added Saragossa. (4) The genus *Claopodium* in Spain. *C. Whippleanum* (Sull.) Ren. & Card., var. *cavernicolum* Luis., a new variety from Salamanca, is conspecific with *Leskea algarvica* Schimp., discovered by the late Count Solms-Laubach at Monchique in 1866, which after much discussion has been declared to be identical with *Claopodium Whippleanum* of the United States. (5) *Desmatodon meridionalis*, a new species from the south of Portugal, described and figured. (6) A further note on *Triquetrella arapilensis*; two new stations. (7) The genus *Brachymenium* in Europe. Hitherto confined to tropical and subtropical regions this genus is now represented by *B. lusitanicum* in Portugal, a new species described and figured by Hagen. (8) New species for the Spanish flora—nine additions to the list of mosses of the Iberian Peninsula recently published by Casares Gil.—A. G.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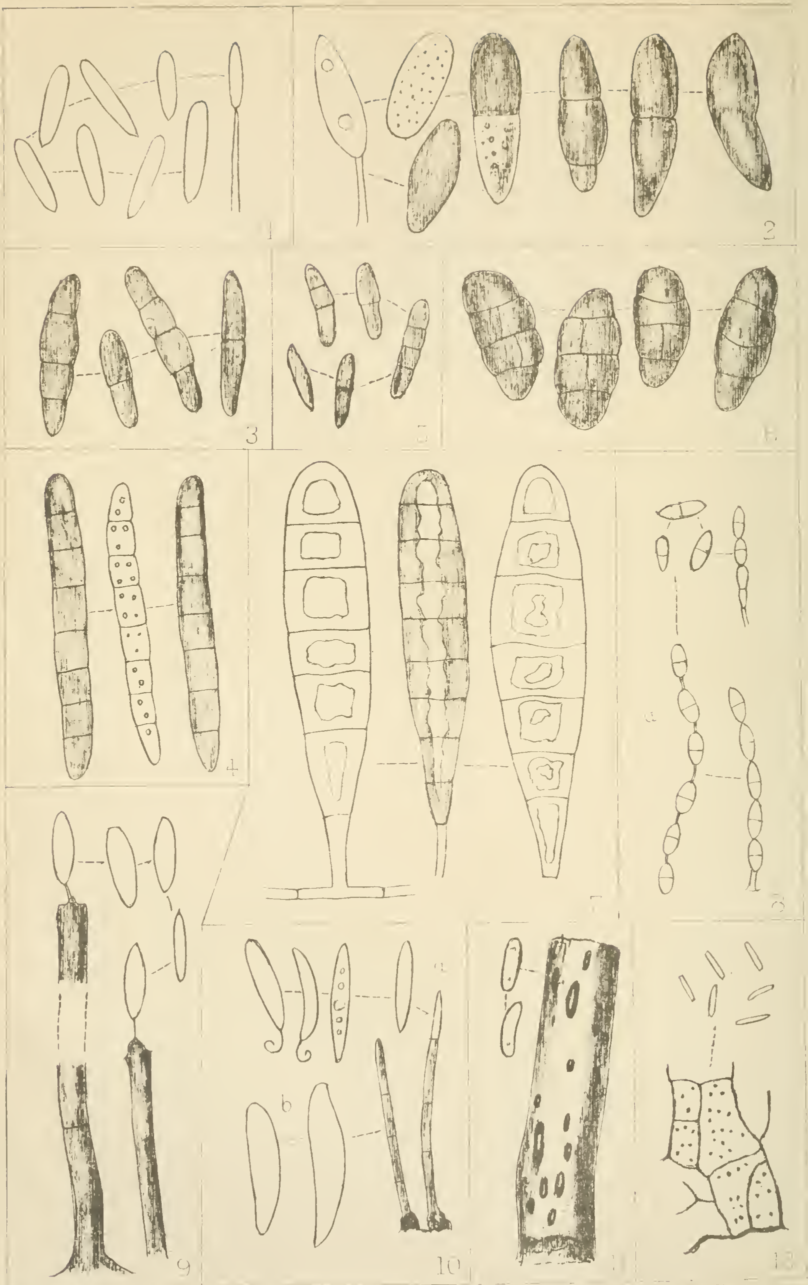
Adlard & West, Newman imp.

New or noteworthy Fungi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Highley lith.
West, Newman imp.

New or noteworthy Fungi.

NEW OR NOTEWORTHY FUNGI.—Part V.

By W. B. Grove, M.A.

(Concluded from p. 193.)

234. **Hendersonia tarda** sp. n.

Pycnidiis amphigenis, sæpius epiphyllis, sparsis, globosis, poro pertusis, non papillatis, epidermide supra porum perforata, 220–250 μ diam.; contextu plectenchymatico, subolivaceo. Sporulis anguste elliptico-oblongis, junioribus utrinque acutatis, dein rotundatis, dilute olivaceis, diutissime 1-septatis, 8–12 μ long., absolute maturis 3-septatis, 15–16 × $2\frac{1}{2}$ μ. (Tab. 543, fig. 5.)

Hab. in foliis emortuis *Ilicis Aquifolii*, Hereford, Febr., sociis *Phoma* quadam immatura (sporis 6 × 3 μ) et fungis quibusdam aliis.

The spores are held together when young in a clear-olive mucilaginous mass, but singly are very pale; at first they are lanceolate-fusiform and eseptate, then for a long time 1-septate, but ultimately a few show two septa and still fewer three septa.

235. **Hendersonia mollis** sp. n.

Pycnidiis lineatim inter costas vaginæ seriatis, immersis, ca. 300 μ diam., depresso-sphæricis, nigrescentibus, epidermidem perforantibus, labecula brunneola cinctis; contextu mollisimo parenchymatico pallide ochraceo. Sporulis fusoideo-cylindricis, obtusiusculis, altero apice subattenuatis, 38–42 × 4–5 μ, primitus hyalinis, dein brunneolis guttulatisque, demum olivaceo-brunneolis v. flavescentibus, tenuiter sed distincte 6–7-septatis, cellula utraque guttulis minutissimis utrinque ad septa prædita; sporophoris brevissimis (?). (Tab. 543, fig. 4).

In vagina emortua Graminis ignoti (? *Melicæ*), Ledbury, Maio.

The mature spores were almost uniformly provided with seven delicate, but unmistakable septa, with one or two minute guttules on each side of the septum. The species is allied to *H. riparia* Sacc., but no distinct sporophores could be seen. It might also be near to *H. intermixta* Cooke (*Stagonospora* Sacc.), the pycnidia of which are not described. The spores agree also with the description of those of *Wojnowicia hirta* Sacc (Syll. xiv, 960), but the pycnidia are different.

236. Hendersonia Letendreana Sacc. Syll. iii, 433, f. Dipsaci.

Pycnidia subglobose-depressed, showing through the thin epidermis, which is pierced, 100–140 μ diam., black; texture thin, yellowish-fuscous. Spores cylindrical or faintly clavate, mostly curvulous or flexuous, very pale olivaceous, mostly 3-septate, not constricted, 23–26 × $1\frac{3}{4}$–2 μ.

On dead stems of *Dipsacus silvestris*, Credenhill Camp, Hereford, June. This form differs from the species especially in its narrower spores, in which it resembles Saccardo's variety *muralis* (sp. 20–25 × 2–3 μ); the septa are very delicate, and the spores approach those of a *Septoria* or a *Rhabdospora* (such as *R. calcitrapæ* Sacc.), but are distinctly tinged with olivaceous, especially when seen in mass. The *Hendersonia* was accompanied by *Pleospora herbarum*, *Phoma herbarum* f. *Dipsaci* Sacc. (sp. eguttulate, 8–9 × 3–4 μ), and by other imperfect fungi, including a *Leptothyrium* with *Phoma*-like spores.

237. HENDERSONIA TENELLA Schröt. Pilz. Labrador, p. 19. Sacc. Syll. x, 325.

Pycnidia caulicolous, subepidermal, spherical or oblong, 200–250 μ diam., black, surrounded by a few dark-olive septate creeping fibres, pierced by a pore, above which the epidermis is split; texture membranaceous, rather soft, parenchymatous. Spores fusoid-cylindrical, rounded but tapering slightly at one end, if not at both, sometimes slightly curved, rather pale brownish-olive, 3-septate, 20–25 × 3–4½ μ. (Tab. 543, fig. 3.)

On old rotting stems of *Saponaria officinalis*, Hartlebury Common, May. It was accompanied by *Phoma herbarum* on the stems and *Pleospora herbarum* on the leaves.

238. CAMAROSPORIUM RUBICOLUM Sacc. Syll. iii, 462.

Pycnidia scattered, globose, covered, but prominent, then erumpent, black, about 250–300 μ diam. Spores very numerous, oblong-ellipsoid, sometimes obovoid, occasionally curved or subangular, rounded at the ends, brown, usually 3-septate, with 1–3 cells longitudinally divided, not constricted, 16–22 × 6–7 μ, sometimes irregular and even 8 μ wide. (Tab. 543, fig. 6.)

On stems of *Rubus*, Shustoke, April, 1888. On young sarmenta of *Rubus discolor*, Hereford, March, 1914.

The spores are at first hyaline and oval, 10 μ long or less; soon they become coloured olivaceous-brown, and 1-septate in the middle, then 3-septate, and at length dark-brown and muriform. An occasional spore may have more than three, even six, transverse septa. In the not quite mature 3-septate condition this might easily be called *H. rubi* Westd., but the spores are not subacute at the base, nor is the lowest loculus paler than the others.

239. COLLETOTRICHUM LINEOLA Corda, in Sturm, Deutsch. Cr. Flor. iii, 3, p. 41, pl. 21. Sacc. Syll. iii, 736.

Bristles at times in rows, at others aggregated into a false appearance of a conceptacle, cuspidate, smoky-brown, paler upwards, 60 × 3. Spores fusoid, arcuate, acute at each end, especially above, 3-guttulate, 25–28 × 3½–4 μ, arising at the base of the bristles on very short sporophores. (Tab. 543, fig. 10 *b*.)

On sheaths and culms of *Dactylis*, Olton, June. In my specimen the spores measured 22–27 × 2½–3 μ.

Var PHRAGMITIS var. n. Sporulis brevioribus, amplioribus.

Forming numerous small crowded black spots, which are caused by the epidermal cells being crammed full of a mass of rather large pale-brown oblong or oval cells, not arranged distinctly as hyphæ (*i.e.* pseudoparenchymatous). Later there arises on this a circle of bristle-like erect hyphæ, which are olive-brown or dark-brown, paler upwards, curved, rather pointed, continuous, 50–70 × 2½–3 μ. Within this circle are the spores, oblong-fusoid, continuous, sometimes guttulate, hyaline, 15–25 × 3–4 μ: sporophores very slender, short.

On culms of *Phragmites*, Moreton, Cheshire, April 6th, 1912 (J. W. Ellis). There is no trace whatever of a pycnidium.

240. Colletotrichum Volutella Sacc. Syll. iii, 736.

Pustules erumpent, flat, oblong, varying in size, up to 1½ mm. long, scattered or aggregated, black, with a grey disc which is surrounded and penetrated by long, black, straight, slender septate bristles, which are up to ½ mm. high by about 3–5 μ broad. Spores colourless, fusoid, curvulous, acute at both ends, 13–18 × 2 μ, with three or four guttules; sporophores very short. (Tab. 543, fig. 10 *a*.)

On dead stems of *Rubus fruticosus*, Thurstaston, Cheshire, July 3rd, 1914 (J. W. Ellis). Some of the spores have at one end a curious curled appendage (? sporophore).

241. Leptothyrium Platanoidis Pass. in Brun. Champ. nouv. vi, 4. Sacc. Syll. x, 413.

Spots pallid-brown, variable in size. Pycnidia standing singly, but collected into little groups, each of which occupies an area bounded by venules (these areas coalesce to form a larger, more or less angular spot), hypophyllous, scutate, rather prominent black, 60–100 μ diam., opening by a wide pore; texture parenchymatous, smoky-brown. Spores rod-shaped, generally quite straight (very rarely slightly curved), 4–5 × 1 μ, each end obtuse and occupied by a faintly marked guttule. (Tab. 543, fig. 12.)

On living leaves of seedling Sycamores (*Acer Pseudoplatanus*). Park Mill, Gower Peninsula (J. W. Ellis). Himley Park, Staffs. September, October, 1915. The discovery was almost simultaneous in both localities. The disease is very destructive to the seedling plants.

242. Leptostroma spiræinum Vestergr. Micr. rar. sel. no. 538. *L. herbarum* var. *spiræinum* Sacc. & Briard, Flor. Cr. Aube, p. 416. Sacc. Syll. x, 420. *Placosphæria clypearia* Br. & Har.

Pycnidia narrowly elliptic, up to about 2 mm. long, scattered, never crowded and confluent, rather flat or faintly convex, smooth, black, shining, often whitish in the centre where they open by an elongated pore or fissure. Spores oblong, rounded at the ends, 6-9 × 2 μ, biguttulate or not. (Tab. 543, fig. 11.)

On dead stems of *Spiræa Ulmaria* and various cultivated species of *Spiræa*; Raby, Cheshire (Ellis); Sutton Coldfield; Studley. March – June. Sometimes the spores are as small as 5–6 × 1½ μ; Saccardo gives the size as 7–8 × 3½–4 μ, but they are all states of the same species, which is distinguished from *L. Spirææ* not only by its broader spores, but also by its much larger pycnidia which are never crowded and confluent.

243. Excipulina ramicola Grove. *Excipula ramicola* C. & M. Grevill. xvi, 9.

Very perfect specimens of this fungus were found on old dead decorticated branches of *Ilex Aquifolium*, near Sheldon Hall (Wk.), April, 1913. The pycnidia were subglobose, scattered or gregarious, about 250 μ diam., black, composed of rather loose parenchymatous dark-olive tissue, soon becoming torn at the summit, and at length excipuliform. Spores clavate-cylindrical or subfusoid, usually obtuse above, hyaline, straight or curvulous, 25–35 × 3½–4 μ, very distinctly 3–7 septate, each loculus usually containing a large guttule. Having examined Cooke's original specimens, on decorticated branches of *Acer*, I find them to be exactly similar (the spores being distinctly septate).

244. STERIGMATOCYSTIS SULPHUREA Fres. Beitr. p. 83, pl. x, figs. 30–33. Sacc. Syll. iv, 73.

Fertile hyphæ erect, ½–1 mm. high, simple, non-septate, about 8–9 μ broad, rather thick-walled; vesicle globose, 16–18 μ diam.; sterile hyphæ creeping; all pale sulphureous or nearly colourless. Capitula about 60 μ diam., sulphur-yellow; sporophores about 8 μ long, clavate, each bearing 2–5 sterigmata, which are lanceolate and of about the same length; conidia nearly spherical, 2–3 μ diam., yellow in mass.

Forming effused roundish patches on a rotting fabric, Scarborough (T. B. Roe), July, 1913. The sterigmata were occasionally in twos, but most frequently in threes. I have received exactly the same fungus from West Australia, on mummified pears.

DIPLOÖSPORA gen. nov.

Conidia uniseptata, catenulata, plus minus ovalia, subhyalina, hyphis erectis brevibus ex mycelio repente oriundis suffulta.

245. **Diploöspora rosea** sp. n. Mycelio repente, tenuissimo, achroo. Hyphis fertilibus brevissimis, fasciculatis; conidiis in catenas longiusculas ramosas digestis, oblongis, utrinque apiculatis, 1-septatis, leniter constrictis, 5–6 × 1¾–2 μ, roseis. (Tab. 542, fig. 8.)

Hab.—In *charta* humida, Scarborough, July, 1913 (T. B. Roe leg.).

The tufts of hyphæ were not confluent, but arranged more or less in concentric rings or scattered. They were of a dull pink colour and not above ¼ mm. high. When seen dry, the chains looked as if the spores were united by isthmuses, but this was due to the apiculate ends. Singly the spores appeared colourless, but they formed masses which had a distinct rosy tint.

246. **Dactylella plumicola** sp. n.

Hyphis sterilibus hyalinis, repentibus, ramosis, laxe intricatis, 2–2½ μ cr., ramulos conidiiferos brevissimos hinc inde sparsos gerentibus. Conidiis copiosis, clavulato-ellipticis, 4–10-septatis (septis sæpius senis v. septenis), apice obtuse rotundatis, basin versus attenuatis, crasse tunicatis, stipitellatis, loculis gleba oleosa farctis, singulis achrois v. pallidis, coacervatis dilute melleis, 40–60 × 9–10 μ, rarissime 100 μ long. (Tab. 543, fig. 7.)

Hab. in *Plumis* putrescentibus humo semisepultis, immo ad terram, Birmingham, Martio, 1914, plagas pallide ochraceoluteas ½–1 cm. lat. efformans.

The resemblance of the spores, in outline, to those of *Coryneum disciforme* and its allies is very striking.

247. Ramularia sambucina Sacc. Syll. iv, 197.

Spots roundish or elliptical, 3–6 mm. diam., pallid, with a narrow dark fuscous border, showing on both sides of the leaf. Conidiophores hypophyllous, fasciculate, crowded, short; conidia cylindrical, slightly tapering at one end, mostly 1-septate, a few ultimately 3-septate, 22–30 × 3–4 μ.

On leaflets of *Sambucus nigra*, abundant, Studley Castle, July.

248. Ramularia Ari Fautr. in Rev. Mycol. 1892, p. 176. Sacc. Syll. xi, 605.

Spots small, roundish, scattered or collected in groups, at first orange, then ochreous, and often surrounded by concentric borders of various shades. Conidiophores hypophyllous, conidia oblong, slightly curved, two or more guttulate, hyaline, at length 1-septate at the middle, 10–17 × 2½–3 μ, more often 12–15 μ long.

On leaves of *Arum maculatum*, near Conway, old Penmaenmawr Road (J. W. Ellis); Studley; Berkswell; Ledbury. March, April. In the Studley specimens the greater part of the spots were crowded into one patch, which when fresh gathered was bright orange, and looked like those caused by certain Uredines; the parts of the leaf occupied by the hyphæ were sunken above, swollen below, in that case, but not in the others, which were less crowded. Fautrey's description differs somewhat, but probably denotes the same species.

249. Trichosporium calcigenum Sacc. Syll. iv. 295. *Sporotrichum calcigenum* Link, Sp. Pl. Fung. i, 18.

Hyphæ closely applied to the substratum, effused, branched, filiform, fuscous-grey. Conidia subglobose, very small, blackish in mass, spreading over and staining the patches of hyphæ, about 4 μ diam. and dark fuscous when mature.

On damp white-washed walls, especially in hothouses. Germany, Italy. This fungus, agreeing exactly with the characters given, appeared in large quantity, so as to cover and disfigure the whole of a freshly whitewashed damp wall, in a warm plant-house at the Botanic Gardens, Edgbaston, Birmingham, January, 1915. The spores were variable, being often lemon-shaped when pale and immature.

158. Hormiscium callisporum mihi in Journ. Bot. 1912, p. 16.

On stems of *Conium maculatum* at Hereford, in May, 1914, I found this fungus again. The creeping hyphæ and the base of the erect ones have only a faint colour, and are narrow and sometimes almost without septa for a short distance; the cells in that part are barrel-shaped and longer than broad. The upper part is branched like *Hormiscium splendens*. The cells of this part are about as long as broad and globose-cuboid. When placed in water the whole of this upper part breaks up into sections, each containing 4–10 cells (mostly 6 or 7). At first all the cells of each section are smooth, but later the central cells become muriculate and appear as if covered with black dots; sometimes all the cells become so, but usually the end cells of a section remain smooth and paler than the others. Can this be the final, most developed stage of *H. splendens*?

250. **Acrotheca acuta** sp. n.

Hyphis conidiiferis confertis, at non fasciculatis, erectis, brevibus (ca. $\frac{1}{4}$ mm. altis), simplicibus, basi subbulbillosis, inferne pauciseptatis, nodulosis, irregularibus $2\frac{1}{2}$–3 μ cr., dilute fuscis, sursum dilutioribus. Conidiis ad apicem congestis, paucis, propemodum hyalinis, elliptico-fusoideis, superne rotundatis, deorsum attenuatis, $9–10 \times 2\frac{1}{2}$ μ, distincte stipitellatis et denticulis exiguis affixis. (Tab. 543, fig. 9.)

In ligno decorticato stipitis vetusti *Urticæ dioicæ*, basin versus, atque in ipsis *Leptosphæriæ acutæ* peritheciis ei agnatis, Hereford, Maio.

The fact that this grew all over the outside of many of the perithecia of the *Leptosphæria*, as well as on the wood surrounding them, might suggest that it is a conidial stage of that species; on the other hand many of the neighbouring perithecia were quite free from it, and I have never met with it before among the many thousands of perithecia of *L. acuta* which I have examined. I bequeath the task of considering and disproving this suggestion to younger men with more leisure than I possess. The affected perithecia looked at first sight as if they belonged to a species of *Lasiosphæria*.

251. SYNCEPHALIS INTERMEDIA Van Tiegh. in Ann. Sci. Nat. 1875, p. 127, figs. 110–5.

Mycelium very delicate, hyphæ forked, not $1\frac{1}{2}$ μ broad; sporangiophores erect, standing singly, but gregarious, yellowish, about $\frac{3}{4}$ mm. high, 20 μ broad, slightly swollen below, clavate above, head about 40 μ broad, the upper half covered with little rounded warts when mature, filled with a yellow protoplasm. Sporangia cylindrical, fasciculate as in *Aspergillus*, but all tending upwards, about 75×3 μ when young, many arising two or even three together on an irregular or rather cordate basal cell. Spores oblong, obtuse, $6–12 \times 5$ μ, colourless at first, then sometimes faintly brown and covered by the wrinkled wall of the sporangium. Stylospores in rows, spherical, on short pedicels. At the base of the sporangiophore, where it is slightly constricted, is a fascicle of rhizoids (clamps) which are swollen at their insertion, then tapering to the extremity, branched, and 1–3-septate.

On crops of *Mucor* spp., on horse-dung, almost every year, Birmingham, March. Recorded from Leith Hill, Surrey, in Trans. Brit. Myc. Soc. 1903, p. 31; see also Annals of Botany, 1902, xvi, 77, figs. 23–6. After originating on the Mucor, the *Syncephalis* spread widely on the sides of the glass vessel in which the crop was growing.

252. SYNCHYTRIUM SANGUINEUM Schröt. Hedwig. 1876, xv, 134.

Sori of sporangia contained in compound warts (about $\frac{1}{4}$ mm.

diam.) which are crowded in patches and raised slightly above the surface, usually the lower but occasionally the upper, of a leaf: in the middle of the wart is the enlarged epidermal cell, full of brilliant orange contents, surrounded by a number of colourless, less hypertrophied epidermal cells. If the warts are numerous, the leaf is crinkled, and often coloured crimson with anthocyan; such leaves are usually deformed and smaller.

Sporangia, when formed, 9–10 in each sorus, irregular, angular, oblong, polyhedral or roughly crescent-shaped, the membrane colourless, thicker at the angles; they are filled with bright-orange granular contents, which later divide into very numerous little rounded orange masses (swarm-spores) about 7 μ diam. At the corners the mass of swarm-spores is not in contact with the membrane, and at these points, when the sporangium is nearly ready to dehisce, the flickering of the cilia can be easily seen.

On radical leaves of *Cirsium palustre*, near Widney Manor Station, June. No doubt closely allied to *S. Taraxaci* De By., but showing small differences, especially in the fact that each sorus forms only 9–10 sporangia.

Explanation of Plates.

Plate 542.—1. *Leptosphæria Fuckelii*, ascus and paraphysis, × 500; spores, × 1000. 2. *Sordaria coronifera*, perithecium *in situ*, × 50; ascus and single spore, × 250. 3. *Diaporthe stictostoma*, ascus and spores, × 1000. 4. *Phoma lirelliformis* var. *aucubicola*, twig of *Aucuba*, with the fungus, nat. size; spores (of two kinds?) and sporophores, × 1000. 5. *Phoma Arctii*, spores and sporophores, × 1000. 6. *Fusicoccum quercinum*, spores, × 1000. 7. *F. glœosporoides*, spores and sporophores, × 1000. 8. *F. Aceris*, spores and sporophores, × 1000. 9. *Septoria oxyspora* var. *culmorum*, spores, × 1000. 10. *Sphæronæma cornutum*, pycnidia, × 60.

Plate 543.—1. *Ceuthospora Euonymi*, spores. 2. *Diplodia Saccardiana* var. *anglica*, spores. 3. *Hendersonia tenella*, spores. 4. *H. mollis*, spores. 5. *H. tarda*, spores. 6. *Camarosporium rubicolum*, spores. 7. *Dactylella plumicola*, spores. 8. *Diploöspora rosea*, spores in chains and free; *a*, a chain seen dry. 9. *Acrotheca acuta*, spores and sporophores. 10. *a*, *Colletotrichum Volutella*, spores; bristles × 100. *b*, *C. Lineola* var. *Phragmitis*, spores. 11. *Leptostroma spiræinum*, stem of *Spiræa* sp., with the fungus, × 2; spores. 12. *Leptothyrium Platanoidis*, portion of a leaf, with the fungus, × 5; spores. (All spores × 1000.)

AN OVERLOOKED BRITISH MINT.

By James Britten, F.L.S.

Turning over the pages of Smith's *Plantarum Icones hactenus ineditæ* (usually referred to as "Icon. ined.") my attention was arrested by a note on the text accompanying t. xxxviii (fasc. 2, 1790). It may be worth while to record the results of the investigation to which this led, leading as they apparently do to the inclusion in British lists of a plant which, although hitherto omitted from them, has as much—or perhaps as little—claim to a place there as many that appear therein.

It will simplify matters if I begin by transcribing from the *Icones* what bears upon the point at issue, omitting Smith's detailed description of the plant.

"Mentha exigua, *Linn.* . . .

"Mentha floribus verticillatis, foliis lanceolato-ovatis, glabris acutis integerrimis. *Linn. Sp. Pl.* 806, *exclusis syn. Fuchsii, Lobelii & forte Raii.*

"Ex Anglia Linnæo misit Phil. Miller; de loco ejus natali nihil in specimine vel literis Milleri invenio. In Scotiâ ab Houstono lectam putat Cel. Hudson. . . .

"Obs. Planta adhuc valde obscura nec certè Britanniæ indigena. Synonyma in Speciebus Plantarum proculdubio erronea sunt. Mentha aquatica exigua Raii est *M. gentilis* Linn. secundum Dom. Stokes. Herbarium Buddleanum in Museo Britannico mihi nullam adtulit lucem. Qui cum Cl. Hudsono plantam nostram varietatem *M. Pulegii* esse putabit, vix errabit."

The figure given by Smith from the Linnean specimen and the specimens themselves agree so closely with Miller's own example in the National Herbarium that we may fairly conclude that the two formed part of the same gathering. Miller's description (Dict. ed. 7, 1759) is the first that was printed, although his name *exigua* dates only from the 8th edition (1768) in which the description is reprinted without alteration. It is, in his own hand, attached to his specimen and runs:—"Mentha (*Exigua*) floribus verticillatis, foliis ovato dentatis, staminibus corollá longioribus." Miller's description on the ticket is preceded by a note by Houstoun who names the plant "Mentha aquatica exigua, Trag. Lib. i, c. 6 [f. 24]: Calamintha arvensis verticillata, sive aquatica Belgarum Lobelii. Park. 36"; but neither of the figures on the pages quoted represents *M. Pulegium.* Tragus's name is cited by Miller quite definitely for his *exigua*—"This is the *Mentha aquatica, exigua.* Trag. Lib. i, c. 6": and the sheet which he sent to Linnæus is endorsed by him with this name, which doubtless suggested the Linnean and Millerian trivial. Hence it would appear that the confusion which has prevailed concerning the plant began with those who first used the name.

Miller localizes the plant as growing "in watery places in many parts of England." I find nothing in Hudson to confirm Smith's statement that he supposed Houstoun to have collected the plant in Scotland; but Houstoun's writing, standing first as it does on Miller's label, suggests that the plant may originally have come from him.

Smith rightly points out that the synonymy cited by Linnæus (Sp. Pl. ed. 2, 806, and earlier in *Centuria* II (1756) reprinted in Amœn. Acad. iv. 318: 1759), does not apply to Miller's specimen, on which the description appears to be based. It is a remarkable illustration of the neglect of Miller's work, even by his contemporaries, which prevailed until recently, that I have found nowhere any reference to his description of *M. exigua*, nor indeed has any writer on British plants, so far as I am aware, called attention to it. When the name has been taken up, it has usually been in connection with the Linnean description so far as Ray's plant (cited as a synonym) is concerned: the only exception to this is Hudson (Fl. Angl. ed. 2, 254: 1778) who rightly places Linnæus's description under *M. Pulegium* as a variety (*exigua*), and refers Ray's plant with its synonymy to *M. gentilis*, where Linnæus himself had placed the figure of Fuchs which he also quotes for *M. exigua*. It may be well for those who have not ready access to the book to quote the description from Sp. Pl. ed. 2, 806 (1763):

"exigua. 10. Mentha floribus verticillatis, foliis lanceolato-ovatis glabri sacutis integerrimis. *Amœn. acad.* 4, p. 318.
Mentha aquatica exigua. *Raj. angl.* 3, p. 332.
Mentha hortensis 4. *Fuchs. hist.* 291.
Calamintha aquatica belgarum & matthioli, *Lob. ic.* 505.
Habitat in Anglia. Miller."

Stokes (in With. Arr. ed. 2, ii, 602) writes of "the figures referred by Linnæus to his *M. exigua*": "that of Lob. ic. 505 is *M. arvensis*, and Fuchs 291 is also referred by Linnæus himself to his *M. gentilis*. But Linnæus does not give any reason to suppose that his plant had any peculiar affinity with *M. Pulegium*, and Ray's plant is Mr. Hudson's *M. gentilis* β. The present I can only conjecture to [be] a *M. Pulegium* with narrower leaves than usual." It must be remembered that even Stokes makes no reference whatever to Miller's description, nor did he see Linnæus's specimen on which the description in Sp. Pl. is based. Hudson, to whom he refers, placed the above-quoted synonymy, as well as the reference to Tragus already cited—in this case according to Stokes (*l. c.* 501) incorrectly—under his *M. gentilis* β. Martyn, in his edition of Miller (1807) makes no reference to *M. exigua*.

Miller's plant, although hardly presenting sufficient characters to stand as a variety, differs greatly in appearance from ordinary *Pulegium*—so much so, indeed, that the usually accurate Dryander had named it *Cunila* (*Hedeoma*) *pulegioides*, under which name it had lain *perdu* in the Herbarium. I am indebted to Mr. Wilmott for examining the flowers, which show conclusively that the specimen is correctly referred to *M. Pulegium*. If retained as a variety, it will stand as

Mentha Pulegium L. β. exigua Huds. Fl. Angl. ed. 2, 254 (1778).
M. exigua L. Herb.! *Sp. Pl. ed.* 2, 806, excl. syn. (1763) Mill. *Dict. no.* 14 (1768).

It may be noted here that if the stout erect form of *M. Pulegium* which Syme (E. Bot. ed. 3, vii, 24) names "var. β. *erecta*" be maintained as a variety, the authority for the name is of much earlier date. Miller, who maintained *Pulegium* as a genus—thus anticipating Opitz, to whom it is often referred—described this as *P. erectum*: Martyn reduced it to a variety of *M. Pulegium*. The name will stand as

Mentha Pulegium L. var. erecta Mart. *Mill. Dict.* iv (1807); Syme, *E. Bot. ed.* 3, vii, 24 (1867).
Pulegium erectum Mill. *Gard. Dict.* ed. 8, n. 2 (1768).

Syme cites for his variety a specimen collected by Isaac Carroll in Great Island, Cork; we have the plant from this locality (1850) from Carroll's herbarium, which was acquired by the Department in 1874.

NEW GAMOPETALÆ FROM THE SOUTH CAMEROONS.

By H. F. Wernham, D.Sc., F.L.S.
(Department of Botany, British Museum.)

The following types were collected by G. L. Bates—already well-known as a West-African collector—mostly in the neighbourhood of Bitye, Ebolowa (Southern Cameroons), in the winter of 1914–15. They are now preserved in the National Herbarium.

Rubiaceæ.

Otomeria Batesii sp. nov.

Subherbacea, caule gracili volubili striato subglabro long internodiis, vix ramoso. *Folia* membranacea, elliptico-lanceolata, utrinque angustata, ca. 6–7 cm. × 2–3 cm., apice acutissima acuminata, utrinque præsertim in venis obscure minute hirto-puberula, *petiolo* tenui 7 mm.–2 cm. v. longiore: *stipulæ* e basi brevissimo caulem amplectente aristatæ ad 3–4 mm. longæ. *Flores* in capitulis parvis aggregati, subglabri: *calycis* loborum unus oblanceolatus acutissime acuminatus, 9 mm. × 2·5 mm., ceteri anguste lanceolati, vix 2 mm. longi: *corollæ* tubus 2·5 cm. v. longior, tenuis, extus minutissime puberulus, insuper sub lobos ad 2 mm. lat. dilatatus, lobi obovati ± 6 mm. × 4·5 mm. brevissime mucronati, *stylo* ca. 3 mm. e corolla exserto.

S. Cameroons: *Bates* s. n.!

Allied to *O. speciosa* Scott Elliot; but Bates's plant is almost glabrous, with smaller and more slender flowers. Another specimen of this new species has been collected recently by P. A. Talbot in the Degema district of Southern Nigeria.

Randia cacaocarpa sp. nov.

Frutex 8–10-pedalis, ramulis tenuiusculis nisi novitatibus appresse hirtis glabris cortice cinereo indutis. *Folia* oblanceolata, ad 25 cm. × 8·5 cm. vel majora, basi in petiolum brevem validiusculum sublignosum leniter angustata, apice acuminata, supra glaberrima, subtus in venis minute appresse pubescentia aliter glabra, venis secundariis utrinque ca. 12; *stipulæ* caulem amplectentes, parvæ ovatæ breviter apiculata acuminatæ. *Flores* parvi roseo-purpurei in cymulis modestis alaribus mox lignescentibus, paucifloris laxiusculis, vix 2–3 cm. excedentibus dispositi; *calyx* infundibularis extus sparse minute hirtellus 5·5 mm. longus, limbus integerrimus; *corollæ* glaberrimæ tubus latus 5 mm. e calyce exsertus, lobi 5 patentes ovati-acuminati sub-acuti, 4·5 mm. longi, basi fere 4 mm. lati. *Fructus* 5–6 cm. in diam.

Bitye: forest, east of path between Lang and Ejom, November 28th, 1914. *Bates* 664!

Flower carmine or "purple-lake"; fruit yellow, shaped like a cacao-pod, but smaller (Bates). Related to *R. acuminata* and its allies, but readily distinguished by the leaf-shape, calyx-limb, fruit, etc.

Ixora Batesii sp. nov.

Frutex glaber gracilis 15-pedalis, ramulis cortice griseo indutis, nodis plus minus tumidis. *Folia* firme chartacea elliptica, 10–12 cm. × 4–4·5 cm., utrinque basi in petiolum ad 1·5 cm. angustata, utrinque glaberrima, siccitate quidem argenteo-grisea: *stipulæ* nisi ultimæ mox deciduæ. *Flores* albi in cymis laxiusculis triradiatis sparse minute puberulis dispositi, pedunculis gracilibus 3 primaris ad 5 cm. v. longioribus e ramulorum seniorum apice ortis nonnunquam etiam alaribus, basi *bracteis* membranaceis ovatis 6 mm. × 3·5 mm. apiculatis cinctis: *calyx* campanulato-tubularis glaber breviter obtuse dentatus 2 mm. longus: *corollæ* tubus gracilis 11 mm. longus, lobi 6–7 mm. oblongi subacuti: *antheræ* 5·5 mm. longæ.

Bitye: forest, east of path between Lang and Ejom, November 21st, 1914. *Bates* 641!

Related to *I. riparia* Hiern, but the corolla-lobes are relatively longer.

Pavetta permodesta sp. nov.

Frutex glaber parvus vix 10 cm. altus, caule simplice vel raro ramoso, valde sulcato-complanato. *Folia* chartacea, oblanceolata, ± 15 cm. × 4·5 cm., utrinque acuminata apice subacuta basi in petiolum brevem ± 8 mm. longum angustata, utrinque glaberrima, venis utrinque ca. 10–12: *stipulæ* e basi triangulari ca. 4 mm. lato in aristas conspicuas acuminatæ, totæ ad 1 cm. longæ. *Flores* in corymbis pseudo-terminalibus triradiatis sessilibus nisi minutissime pubescentibus glabratis, ± 4 cm. longis, 5 cm. latis, dispositi: *calyx* breviter obtusissime dentatus: *corolla* glabra tubo graciliusculo 6 mm. longo, lobis lanceolatis subacutis 7 mm. longis; *stylus* 5·5 mm. exsertus.

Bitye, February 23rd. *Bates* 716!

Allied to *P. bidentata* Hiern, differing, not only in its very small size, but also in the relatively broader leaves and longer corolla-tube.

Geophila ingens sp. nov.

Herba rhizomate gracili glabra. *Folia* inter maxima, plerumque late cordato-ovata, ad 9 cm. × 7·5 cm., acuminata acuta, utrinque glaberrima, venis secundariis utrinque 3–4, *petiolo* ad 12 cm. longo tenui; *stipulæ* bifidæ. *Flores* plurimi in capitulis ca. 1·7 cm. × 1·7 cm. involucratis glabris, cujus bracteæ ovatæ mucronato-acutæ fere ad basin discretæ, flores subæquantes; pedunculi ad 1·5 cm. vel longiores. *Calycis* dentes triangulari-subulati 2 mm. longi: *corollæ* tubus 7 mm. longus, limbus patens 5 mm. in diametro.

Bitye, in damp, leaf-covered ground, December 5th, 1914. *Bates* 654!

Allied to *G. obvallata* F. Didr., but readily separable in many characters—the bifid stipules, acute-acuminate leaves, etc. The latter are much larger than those of any other species I have seen.

APOCYNACEÆ.

Clitandra Batesii sp. nov.

Frutex scandens, ramulis gracilibus, omnino nisi calycis lobis ciliolatis pedunculisque obscure minute tomentosis glaberrimus. *Folia* glauca, oblonga, cum acumine ca. 8 mm. oblonga apice obtusissimo, ± 10 cm. × 5 cm., basi obtusa vel subacuta, petiolo 7 mm. longo, venis secundariis creberrimis (4–5 per cm.) tenuioribus intervenientibus. *Cymæ* corollis exclusis petiolos subæquantes, laxiusculæ, pedunculis brevissimis; *calyx* vix 2mm. obtuse dentatus; *corollæ* tubus viridescens pro genere præsertim in alabastro validiusculus ± 1·5 cm. longus, lobi albi nonnunquam ad 7·5 mm. plerumque breviores, anguste elliptico-oblongi obtusi.

Bitye: forest near Albimbili, February 3rd. *Bates* 701!

The most nearly allied species seems to be *C. cirrhosa* Radlkof., but our new species is readily distinguished by the glaucous leaves and relatively longer, less slender corolla-tube.

Motandra pœcilophylla sp. nov.

Frutex scandens, ramulis gracilibus minute ferrugineo-tomentosis mox glabrescentibus. *Folia* papyracea, oblonga, ± 11 cm. × 3·5 cm., longiuscule acuminata subacuta basi rotundata, supra læviter glaberrima sublucida, subtus in vena centrali minute sparsiuscule rufo-hirtella, necnon in ejus angulis cum venis secundariis (utrinque 5–6) fulvo-barbata, aliter glabra, subtusque discoloria conspicue reticulato-variegata; *petiolus* ad 7 mm. longus, qua vena centralis etsi densius indutus. *Flores* albi, pro genere inter minores, in thyrsis laxiusculis subpyramidalibus, ramula terminantibus, ± 10 cm. longis, ± 7 cm. basi latis, dispositi, ramulis tomento minuto ferrugineo plus minus dense indutis; *bracteæ* inter minimas inconspicuæ: *calyx* extus minute necnon dense ferrugineo-tomentosus campanulatus vix 1 mm. long. excedens, ejus lobis obtusis tubum subæquantibus; *corollæ* tubus subcylindricus sulcatus vix 2 mm. longus, extus qua calyx indutus, lobi oblongi subacuti 1·5 mm. longi, utrinque glabri.

Bitye: December 4th. *Bates* 649!

Remarkable for the variegated leaves, this species differs from *M. pyramidalis* Stapf, its nearest apparent ally, in the relative size of corolla-tube and lobes.

ASCLEPIADACEÆ.

Periploca Batesii sp. nov.

Gracilis, *caulibus* scandentibus sulcato-striatis, senioribus in lineis duabus oppositis longiuscule pubescentibus; *folia* late ovata, basi auriculato-cordata apice mucrone acutissimo brevissimo, 7–10 cm. × 6–8 cm., utrinque nisi in venis sparsiuscule hirtella glabrata, subtus griseo-discoloria; *petiolus* pubescens 4–5 cm. longus. *Flores* in cymis multifloris umbellatis ca. 3 cm. × 5 cm., pedunculis ad 6 cm. longis gracilibus glabrescentibus, pedicellis gracillimis ad 1·8 cm. longis hirtello-hirsutis; *bracteæ* setaceæ ± 3 mm. longæ: *calycis* lobi ovati acuto-acuminati vix 1·5 mm. excedentes, margine ciliati: *corollæ* extus minute appresse pubescentis lobi intus glabri lanceolati apice subacuti 7 mm. longi basi 2 mm. lati; *coronæ* lobi infra late ovati insuper in apicem setaceum desinentes, totæ ad 5 mm. altitudinis attingentis.

Bitye: December 2nd, 1914. *Bates* 643!

Allied to *P. nigrescens* Afzel., but our species is much more slender, with smaller flowers and differently-shaped leaves.

PERGULARIA AFRICANA N.E. Br., var. OBLONGA var nov. Foliis stricte oblongis, margine obscure hic inde sinuato crenato plus minus 9 cm. × 4 cm.

Bitye: February 20th, 1915. *Bates* 710!

Readily distinguished from the type specimens by the markedly oblong shape of the relatively narrower leaves.

BORAGINACEÆ.

Cordia Batesii sp. nov.

Frutex ramulis sparse novitatibus densius subappresse pilosis. *Folia* firme chartacea, elliptica 10–20 cm. × 4–8 cm., acutissima longe acuminata, utrinque nisi in venis præsertim centrali sparse rufo-hirta glaberrima, *petiolo* validiusculo nigrescente ± 1·5 cm. longo rufo-piloso. *Flores* in cymis paucifloris laxiusculis fusco-tomentosis in ramulis terminalibus; *calyx* extus fulvo-tomentosus alte sulcatus 1·4 cm. longus, dentibus triangularibus 4–5 mm. longis: *corollæ* glabræ tubus vix calycem excedens 1·5 cm. longus, lobi obovati mucronati ca. 9 mm. × 6 mm. *Stamina* e corolla vix 1 cm. exsertæ.

Bitye: shrub at edge of rubber-field, December 1st, 1914. *Bates* 638!

This species is clearly allied to *C. Dusenii* Gürke, but is readily distinguished by the hairy branchlets, short calyx-lobes, and corolla-tube scarcely exserted from the calyx.

ACANTHACEÆ.

Brillantaisia majestica sp. nov.

Herbacea, necnon caule ad multos pedes attingente, suberecta—caule insuper pubescente desuper glabrescente. *Folia* lanceolata ad elliptico-lanceolata, 9 × 3 cm.–12 × 5 cm., longe acuminata obtusa, nonnunquam in *petiolum* tenuiusculum appresse pubescentem decurrentia, supra in vena centrali appresse aliter sparse pilosa, subtus sparsissime nisi in venis densiuscule pilosa, margine subintegra. *Cymulæ* in rachide elongato distantes sessiles, spicam terminalem formantes: *bracteæ* anguste spathulatæ ± 6 mm. longæ pilis longiusculis instructæ. *Calycis* lobi lineares fere ad 1 cm. longi acuminati acutissimi sparse appresse pilosi nec glandulares: *corollæ* extus griseo-pubescentis tubus 1·5 cm. longus, labia 2·8 cm. longa, inferior 2·3 cm. latum.

Buea, by path, 3500 ft. December 31st, 1915. *Bates* 817!

Allied to the eastern *B. madagascariensis* T. Anders., but readily distinguished by the small spathulate bracts and acute, eglandular calyx-lobes.

Macrorungia Batesii sp. nov.

Frutex parvus, ramulis sulcato-complanatis glabratis. *Folia* ad 27 cm. × 11 cm., margine distante crenato, sub-elliptica utrinque longe acuminata, utrinque glabra; venæ secundariæ utrinque 10–12; *petiolus* ad 4–5 cm. longus. *Inflorescentiæ* alares

densæ, pedunculis vix 1 cm. longis qua *bracteis* ovatis breviter acuminatis acutis ca. 12 × 8 mm. obscure appresse pubescentibus. *Flores* magni; *calyx* 4·5 mm. longus glaberrimus, dentibus anguste triangularibus acutissimis vix 1·5 mm. longis: *corollæ* glaberrimæ tubus 1·6 cm. longus, lobus superior ad 3·5 cm. inferior 2·4 cm. longus: *antheræ* 5–6 mm. longæ.

Bitye: rock of Mesese. December 26th, 1914. *Bates* 687!

This species has leaves like those of *M. macrophylla* C. B. Clarke, from which it is readily distinguished by the smaller bracts and glabrous calyx-teeth.

VERBENACEÆ.

Clerodendron chamæriphes sp. nov.

Suffrutex caule subtereti, minute virido-pubescenti, subherbaceo. *Folia* papyracea, elliptica 10–15 cm. × 5·5–9 cm., basi plerumque obtusa, apice brevissime acuminata obtusissima, utrinque nisi in venis principalibus minutissime hirtella glabra, subtus nec dense glandulari-punctata, venis secundariis utrinque ca. 5, reticulatione interveniente subtus prominente; *petiolus* in partibus duabus discretus, quorum basalis in spina sub-horizontali ca. 1 cm. longa sublignosa indurata, superior herbacea gracilis ascendens ± 5 cm. longa, subquadrangularis, scabridula, irregulariter minute hirtello-puberula. *Flores* in thyrso terminali 15 cm. alto 10 cm. diametro laxiuscule dispositi: *bracteæ* setaceæ, inconspicuæ subminutæ: *calycis* campanulati extus glabri tubus 8 mm., lobi triangulares acuti 2 mm. longi: *corollæ* glaberrimæ tubus gracilis e calyce 1·5 cm. exsertus, lobi subæquales late ovato-elliptici 5–6 mm. × 4·5 mm., apice rotundato-obtusi vel subacuti.

Bitye: December 10th, 1914. *Bates* 663!

Related to *C. Buchholzii* Gürke, but the corolla-tubes are relatively much longer in our species.

Clerodendron fugitans sp. nov.

Frutex scandens, caulibus subteretibus subfistulosis glabrescentibus striatis. *Folia* glabra tenuiter membranacea, elliptica 8–11 cm. × 5–6 cm., basi rotundata, apice breviter acuto-acuminata; *petioli* ± 1 cm. longi, hic inde hirto-pubescentes vel glabri; *venæ* secundariæ utrinque ca. 4. *Flores* in capitulis ramulos alares laterales terminantibus, subsessilibus vel in pedunculis brevissimis, pro rata parvis—in flore vix 3 cm. in diam.—dispositi *bracteis* exterioribus anguste lanceolatis interioribus latioribus, ± 1 cm. longis, acutissime acuminatis argenteo-ciliatis aliter subglabris: *calycis* tubus extus glaber vix 2·5 mm. longus, lobi bracteis indumento necnon forma nisi latiores (ad 4·5 mm.) similes, nervatione tenuissima etsi clarissima: *corollæ* tubus extus nisi hic inde sparsissime glandulari-pilosus glaber, gracilis, 5·5–6·5 cm. longus, lobi elliptici apice rotundato ± 1 cm. × 5 mm., utrinque glabri.

Bitye: edge of path near Mbimbili near forest. December 15th, 1914. *Bates* 676!

This is readily distinguished from most of the capitate species by the small heads and small bracts and calyx-lobes; and from *B. Talbotii* Wernham, its nearest apparent ally, by the much longer corolla-tube.

Clerodendron subpeltatum sp. nov.

Frutex nisi novitates axesque florentes minutissimo glandulari pube induti glaber, ramulis gracilibus lævibus subteretibus striatis. *Folia* membranacea, glandulis minutissimis lucidis plus minus dense punctata, plerumque late ovata, 6–10 cm. × 4·5–7 cm., apice brevissime mucronato-acuminata acutissima, basi subpeltato-cordata, venis secundariis utrinque 4, *petiolis* gracilibus ad 5 cm. vel longioribus. *Flores* minute undique glandulari-punctati in cymis laxiusculis umbellatis alaribus necnon pseudo-terminalibus dispositi, pedunculis primariis 2–4 cm. vel longioribus, *bracteis* minutis: *calycis* campanulati tubus vix 5 mm. longus, lobi ovato-lanceolati acuminati acuti 10 × 3·5 mm.: *corollæ* tubus ad 1·7 cm. cujus longitudinis ca. dimidio exserto, extus minute glandulari-puberulus, lobi obovato-lanceolati 1 cm. × 5 mm. basin versus acuminati apice rotundati: *stamina* e corolla 4–5 cm. exserta, antheris oblongis 2 mm. longis.

Along road near forest—about Benito. December 4th–11th, 1915. *Bates* 800! 811!

Allied to *C. scandens* P. Beauv.—but readily distinguished by the markedly notched-cordate, or subpeltate, leaf-base. The Abyssinian *C. cordifolium* (*Volkameria cordifolia* Hochst.) has similar leaves, but much smaller flowers.

I take the present opportunity to publish the description of an interesting new Rubiaceous plant, collected by Archdeacon Rogers at Victoria Falls, the type of which is also in the National Herbarium.

Dirichletia Rogersii Wernham sp. nov.

Frutex ramulis sparse minute puberulis complanatis. *Folia* chartacea lanceolata ad ovata 4–7 cm. × 1·5–3 cm., acuminata basi in petiolum brevem (vix 5 mm.) pubescentem angustata, supra microscopice scabridulo-papillosa, subtus in venis griseo-pubescentia, aliter glabra; *stipulæ* demum vaginantes aristis tribus centrali ad 3–4 mm. lateralibus multo brevioribus instructæ. *Flores* in corymbis ramulis griseo-pubescentibus dispositi, pedicellis gracilibus ad 1 cm. vel longioribus: *calyx* irregulariter necnon alte trilobatus, in flore 3 cm. diametro excedens: *corollæ* tubus extus glaberrimus lucidus, 4·5 cm. long. attingens, sub lobos ovatos breviter acuminatos limbum 1·2–1·4 cm. diam. ore dense barbatum formantes dilatatus.

S. Rhodesia, Victoria Falls, 3000 ft. *Rev. F. A. Rogers* 5533!

This species is distinct in the indumentum of the vegetative parts and large flowers with very distinctly three-lobed calyx.

ISLE OF WIGHT PLANTS.

By Frederic Stratton, F.L.S.

It may be useful as well as interesting to place on record the occurrence in the Isle of Wight of some plants which have either not before been noted, or only very rarely, and also to point out, with regard to some of them, the probable cause of their appearance.

The River Medina, which almost completely divides the Island into two districts known as the East and West Medenes, starting from the northern slope of St. Catherine's Down, becomes at Newport a tidal river, between that town and the ports of Cowes and East Cowes. There has of late years been a considerable extension of the quays at Newport on the east bank, and deepening of the channel by dredging. The mud and *débris* dredged out has been deposited on the west bank, filling up the loss of soil over some acre or two washed away in former years. On this deposit an immense number of plants have sprung up, and amongst them numerous melilots of the following species: *Melilotus parviflora* Desr. (not recorded hitherto for the Isle of Wight nor I believe for Hampshire), *M. alba* Lam. (very rare in both the Island and Hants, I have never met with it before), *M. arvensis* Wallr. (*officinalis*, Desr.), also very rare in the Island and Hants. All these are in district IV. 3. of Townsend's Flora. *Melilotus altissima* Thuill. (*M. officinalis* Willd.) sometimes appears in vast quantity by roadsides, as at Totland Bay and railway embankments.

Lepidium Draba L. In district IV. 1. abundant near the Railway Station and the old Mill at Yarmouth. IV. 3. Whitepit near Newport and on the deposit of mud referred to above.

Erysimum cheiranthoides L. In district IV. 3. plentiful in cultivated ground south of Newport. The only record of the occurrence previously of this plant is the note in Bromfield's *Flora Vectensis* (1856) on p. 36, "*Erysimum cheiranthoides* L. grows just within the lodge-gate leading to Mrs. Goodwin's house at W. Cowes, but has the appearance of having been sown there for an ornamental border-flower." This observation must have been made before 1850, as Dr. Bromfield in that year started on his journey to Egypt and Syria, from which he never returned. *Sisymbrium pannonicum* Jacq. occurred (1914) in waste ground near Newport.

Lythrum Hyssopifolia L. In 1867 I found this growing in waste ground at St. John's near Ryde, formerly the kitchen garden of St. John's House. I have little doubt that it was sown there by Dr. Bromfield.

Epilobium angustifolium L. About the year 1906 a pine wood on St. George's Down, near Newport, was very largely destroyed by fire. Up to that time few plants of any kind were to be found there, and certainly not *Epilobium angustifolium*, which in September, 1909, I found in vast profusion growing all over the burnt portions. The nearest locality to this in which *E. angustifolium* grew is in the Blackwater valley a mile or so distant, but in the direct course of our prevailing wind from the south-west.

Stachys germanica L. In September, 1909, Mr. E. W. Hunnybun sent me a specimen from near a chalk-pit above Steephill. This plant has not hitherto been noted for the Island and appears to be either very rare or extinct in Hampshire.

HERTFORDSHIRE POPLARS.

By J. E. Little, M.A.

The following notes refer chiefly to North Herts, but a few records from other districts, also from my own observation, are included.

The nomenclature of the Cambridge British Flora is followed.

*Populus alba L. (♀ only).

(1) *Herts* v.c. 20. (Larger trees only are mentioned.) Four trees on the left bank of the Ivel, between Norton Mill and Radwell Mill, averaging 80 ft. in height, 12–13 ft. in girth at 3–4 ft. from ground, with a spread of 70–80 ft. See Watson Bot. Exch. Club Report, 1912–13, p. 409. These are probably Coleman's record, "Riverside near Radwell" (*Flora Hertfordiensis*, 1849).—Two trees in a spinney south of Oughton Head Common, Hitchin: height 65 and 60 ft.—Weston Park, Stevenage: an avenue planted by Mr. M. Pryor about forty years ago.—West side of Cadwell Common, on the lane: one tree, height about 60 ft.—Garden at Hertford Heath, at the junction of the Roman Road with the main road, one tree. There is also a *P. canescens* Sm. ♂ at the same place. This may be the tree of which Coleman (*op. cit.*) remarks: "By Herman St., a quarter of a mile S. of Hertford Heath, the only fertile tree we have observed near Hertford." But I have not seen mature catkins upon it.—Haileybury College, near the Swimming Bath. A row of trees about thirty years old.

(2) *Beds* v.c. 30. Cadwell Bridge, near Ickleford, on the right bank of the Hiz, one tree: height 78 ft. 6 in., girth at 4 ft. from ground 12 ft. 4 in., spread 73 ft. Det. C. E. Moss.

(3) *W. Suffolk* v.c. 26, near Denardiston Hall, one tree.

P. alba var. pyramidalis Bunge. (See Elwes and Henry, *Trees of Great Britain and Ireland.*) A fastigiate form with the outline of a small Lombardy poplar. Herts. Garden at Highbury cross roads, Hitchin, one tree. Garden of "Otterburn," The Avenue, Hitchin, one tree. I have not yet seen catkins on these trees, which are not more than twenty years old.

P. canescens Sm.

(1) *Herts.* (*a*) ♂. Clothall Bury, a line of about twelve

trees.—Weston, one tree on roadside between Weston Park and Tilekiln Farm.—Stevenage, meadow of "The Grange."—Stansteadbury, Ware.—Between Hertford Heath and Brickendon Bury, two or more rows.

(*b*) ♀. Stansteadbury, Ware.

So far as Herts is concerned, I have seen no evidence which would lead one to think that the tree is indigenous.

(2) *Beds.* ♂. East of Old Warden Park, a clump of five trees near the stream by the Park gate towards Lower Hill Farm.

(3) *West Suffolk* v.c. 26. Clare, a line of trees by the roadside halfway to Poslingford and near Wentford.—Dalham, at the lower end of the village on the right bank of the stream. (See B.E.C. Report, 1912, p. 286.)

P. CANESCENS × TREMULA C. E. Moss = *P. hybrida* Bieberstein.

Herts. ♀. Grove Road, Hitchin. (Det. C. E. Moss; see B.E.C. Report, 1912, p. 286.) Girth at 4 ft. from ground 4 ft. 4 in., height 40 ft., spread 33 ft. The tree has now lost its top, is being choked by macadam, and is now dying. Scales of catkins like those of *P. tremula*, 5 mm. long by 2 mm. wide, narrowed into pedicel below, green or pale below, brown of lighter colour than *P. tremula* in upper middle, with laciniate extremities not so conspicuously long and grey as in *P. tremula;* general outline of scale obcuneate. Cupule fairly loose as in *P. tremula*, not close as in *P. alba*. Ovary as *P. tremula*. Styles two, each bifid. Stigmas pink, broader than in *P. alba*, each division inclining to irregularity, but seemingly proceeding from a linear-subulate plan, and not the wrinkled disk-plan of *P. tremula*. Colour of stigmas a lighter pink, not of the darker purple of *P. tremula*. (Notes from fresh specimens in 1912.)

P. TREMULA L.

(*a*) VAR. SERICEA (Lang ex) Döll = *P. villosa* Lange.

(1) *Herts.* Graffridge Wood, Knebworth. Knebworth Great Wood. Park Wood, Bramfield. Westbury Wood, Offley. Roman Road, S.E. of Hertford Heath.

(2) *W. Suffolk.* East Wood, near Whepstead. Shadow Bush Wood, Poslingford.

(*b*) VAR. GLABRA Syme.

Herts. Hitch Wood (det. C. E. Moss). Roman Road, S.E. of Hertford Heath.

VAR. not determined.

Herts. Wain Wood, ♂. Crouch Green, near Knebworth. Vicar's Grove Wood, St. Ippolyts. Spinney, S. of Little Wymondley, near G.N. Railway, ♂. Box Wood, near Stevenage. Between Purwell and Willian, ♀. Burleigh Meadows, Langley, near Hitchin. Furzefield, near Hitch Wood, ♀. Lane between Grove Mill and Hyde Mill, Ickleford, ♀. Harmer Green Wood, Welwyn. Knebworth Park, West Gate, ♀. Wood near Little Amwell. Between Great Wymondley and Willian, ♀. Balls Wood, near Hertford Heath, S.E. side, ♂.

*P. ITALICA Moench (= *P. nigra* var. *italica* Du Roi).

Herts. Lane between Grove Mill and Hyde Mill, Ickleford. Cadwell. Much planted as a wind screen.

P. NIGRA L. (*b*) VAR. BETULIFOLIA Torrey.

(1) *Herts.* Left "bank of River Beane, between Port Hill and Bengeo [old] church," ♀. This is probably Coleman's record (under *P. nigra*). It is just possible that this tree, now about 100 ft. high, established itself naturally.—Stansteadbury, ♀ (several).—Five trees, near Turnford, Wormley, by the roadside in a clump, evidently planted, ♀.—Coleman's remark on *P. nigra* aggr., "Woods, etc., frequent" (quoted in Pryor's *Flora of Herts* as from Coleman's catalogue) should be further investigated. It certainly does not now apply to North Herts. If *P. serotina* Hartig was not then distinguished, Coleman may have had this latter in mind. I have not found var. *betulifolia* in the Hitchin district.

(2) *W. Suffolk.* Dalham, ♀. (Det. C. E. Moss, see B.E.C. Report, 1912, p. 286.)

(*c*) VAR. VIRIDIS Lindley.

(1) *Herts.* One tree, ♀, evidently planted, by the roadside about halfway between Great Wymondley and Willian. Felled 1916. This is the only tree of *P. nigra* that I have succeeded in finding within a radius of ten miles of Hitchin.*

(2) *West Suffolk.* Windolf's Farm, Stansfield. Two trees, probably planted (? ♂). (Det. C. E. Moss.)

*P. DELTOIDEA × NIGRA VAR. BETULIFOLIA C. E. Moss; P. LLOYDII Henry.

(1) *Herts.* The ford at Ickleford, ♂, about six trees. (Det. C. E. Moss. See Watson Bot. Exch. Club Report, 1912–13, p. 409.) Also on Cadwell Green and in adjoining meadow.—One tree, obviously planted, outside S.E. corner of Tingley Wood.*

(2) *Beds.* One or two trees above Cadwell Bridge, and one on right bank of Hiz, opposite Cadwell (Ickleford) Common, all ♂. (See B.E.C. Report, 1912, p. 287.)

*P. DELTOIDEA × NIGRA VAR. GENUINA.

A. × P. SEROTINA C. E. Moss, ♂ = **P. serotina* Hartig.

Herts. Planted all over the county. Its quick growth and straight stem make the timber of more value than that of *P. nigra*. Locally the Black Italian Poplar is used at Luton for making hat-blocks (*fide* Mr. J. H. Barker, Hitchin). Mr. A. Jacklin (Royston) used a considerable quantity in repairs to machinery in Mr. H. Smith's flour-mills at Royston. Mr. R. A. Saunders (coachbuilder) considers the poplar a tree much undervalued. He has in his yard Black Italian Poplar from Hexton Park which he employs in parts of carriage bodies. Before staining and polishing, the surface is filled up with a saccharine solution (Powellizing).

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* Mr. A. Bruce Jackson inspected the Tingley Wood tree with me on July 15th, 1916. He considers that it falls under true *P. nigra*, and if so must be var. *viridis*. On my herbarium specimen I had noted "very near *P. nigra*." Mr. Jackson also pointed out to me one tree in a row of *P. serotina* at Grove Mill, Hitchin, which he named as *P. nigra* var. *viridis*.

B. * × P. CANADENSIS C. E. Moss, ♀ = *P. canadensis* Moench.

Herts. Planted, Avenue Lodge, The Avenue, Hitchin. The tree was growing into a very fine specimen, but has now (1916) been severely lopped. (See Watson E.C. Report, 1914–15, p. 509.)

C. A tree which appears to belong to the series *P. deltoidea* × *nigra*, but is neither *A* nor *B*. (Herb. J. E. Little, Ref. No. 101.)

West Suffolk. Planted along watercourses between Denston and Wickham brook, and near Badmondisfield Hall, and abundantly in the valley of the Stour between Clare and Haverhill. Leaves smaller and of thinner texture than in *P. serotina*, more of the average size of *P. italica*, but with two, one, or no glands at base of midrib, and in spring of a pale green colour which contrasts strongly with the coppery colour of *P. serotina* at the same time. Faint pubescence, quickly vanishing, on petiole and lamina. (See Watson E.C. Report, 1912–13, p. 408.) In May, 1912, travelling by train from Clare to Haverhill, I could pick this tree out from *P. serotina* by the foliage. Many of the trees are treated in the French fashion, being lopped of side branches sometimes for three-quarters of their height.

*P. TACAMAHACCA Miller = *P. candicans* Aiton.

(1) *Herts.* Plantation at The Node, Codicote. Plantation between Pottersheath and Sisserferns Farm, Codicote. Planted and fenced in by Mr. M. R. Pryor in a field nearly opposite the *P. alba* avenue at Weston Park, Stevenage.

(2) *West Suffolk.* A large tree in the spinney along the stream between Poslingford and Wentford.

(3) *West Sussex* v.c. 13. A number of trees near Fishbourne Church.

Summary. Mr. Marlborough R. Pryor, of Weston Park, considers *P. tremula* our only native poplar in North Herts. Dr. B. D. Jackson, editing A. R. Pryor's *Flora of Herts*, admitted *P. alba* and *P. canescens* as native. Dr. C. E. Moss's investigations have since excluded *P. alba*. I have suggested that *P. canescens* is not native in North Herts. In the lower valley of the Lea it is possible that *P. nigra* may be native, but more and recent records are desirable.

BIBLIOGRAPHICAL NOTES.

LXV.—HENRY ANDREWS AND HIS "BOTANISTS' REPOSITORY."

IN this Journal for 1886 (p. 297, footnote) I expressed an intention of publishing later some notes on the authorship of Andrews's *Botanists' Repository*. I had hoped that in course of time I should succeed in obtaining full light upon the subject, but thirty years have passed since then, and I see little prospect of acquiring more information than I at present possess. Incomplete as this is, it may be worth while to put it on record, in the hope that, attention being called to the work, some future investigator may be able to supplement this beginning.

Concerning Andrews himself I have no information beyond that in a very meagre notice in the *Dictionary of National Biography* (i, 406), and a brief note by Mr. Hemsley in Gard. Chron. 1807, i, 514; these give neither the date of his birth nor death, nor do we even know his second name. He lived chiefly at 5 Knightsbridge, which at the date at which he resided there had not become part of London, and there published his books. Mr. F. G. Wiltshear gives me the following note:—

"Andrews's earliest engravings were published at 15 Ryders Court, Leicester Fields, in 1794. The following year he removed to 25 Denmark Street, Soho, and in 1796 to Knightsbridge, a designation then used in a much more restricted sense than at present to denote a terrace of houses in the district of the same name. His house, no. 5, would appear from contemporary records to have been situated in what is now the Brompton Road, near its junction with Sloane Street, a locality then in considerable favour with artists. His connection with Knightsbridge lasted for nearly twenty years; the re-issue of the *Botanists' Repository* in 1816 was 'published by the author at 24 Berkeley Square,' but shortly afterwards he removed to 25 Sloane Street and later to no. 30."

With the first number of the *Repository*, which appeared in 1797, was issued an address "to the public" which was omitted from the so-called second edition. In this the writer lays stress on the fact that all the drawings would be taken from living plants, and states that "all matter necessary to illustrate the subject, such as name, native place of growth, time of flowering, and culture will be added." It may be noticed that no reference is made here to descriptions, but on the printed title-page to the first volume, where the same information appears, it is stated that all the "essential characters, botanically arranged, after the sexual system of the celebrated Linnæus, in English and Latin" are given. The "engraved title-pages," identical with those ("the whole executed by Henry Andrews") given in the "second edition," were "given gratis to complete the volumes for binding." The preface, which appears also in the reprint, is dated October, 1799; the discrepancy between this and the printed title-page may be explained by supposing that the latter was issued with the first number and the former on the completion of the volume. The work appeared monthly in half-crown numbers, each containing three plates; after thirty-four had been issued the price was raised to five shillings and the number of plates to five; in 1811 the price was further increased to six shillings. In the text accompanying t. 239 we read that "a copious *Index Synonimorum* will be published of all the plants figured in the work at the end of this volume" (iv): but this never appeared.

THE DATES.

The actual dates at which the 137 numbers forming the ten volumes were issued are not easy to ascertain, as a large number of the plates bear no date, notwithstanding the "direction of the Act" (then in force, but unfortunately allowed to lapse) that each should be dated. Dr. Daydon Jackson compiled a list of these dates, so far as he was able to ascertain them, which is prefixed to the copy of the *Repository* in the Kew Herbarium: in this the first six volumes are indicated as follows:—

Vol. I.

Nov.–Dec.	1797	tt.	1–6.
	1798	,,	7–42.
Jan.–Oct.	1799	,,	43–72.

Vol. II.

Nov.–Dec.	1799	tt.	73–78.
	1800	,,	79–128.
Jan.–Mar.	1801	,,	129–144.

Vol. III.

Ap.–Dec.	1801	tt.	145–198.
Jan.–Mar.	1802	,,	199–216.

Vol. IV.

Ap.–Dec.	1802	tt.	217–270.
Jan.–Mar.	1803	,,	271–288.

Vol. V.

Ap.–Dec.	1803	tt.	289–342.
Jan.–Mar.	1804	,,	343–360.

Vol. VI.

Ap.–Dec.	1804	tt.	361–414.
Jan.–Mar.	1805	,,	415–432.

The dates for vols. vii–x are very incompletely given in Dr. Jackson's list. Vol. vii was begun in December, 1806, and the remainder of the volume was issued in 1807; but from this time forward the month of issue is hardly ever noted, and in very many cases the year is not entered, though this can usually be approximately ascertained. From the date mentioned, however, the monthly dates of the later issues, beginning with part 97, may be deduced from the "Monthly Botanical Report"* in the *Monthly Magazine* for 1807–13, from which the following list has been compiled. This gives in successive order the number of the part of the *Repository*—supplied in [ ] when not actually mentioned in the Report—the number of the plate and name of the plant standing first in each part, and the date of the number of the Magazine in which the notice appeared. The last date, of course, is always later than the appearance of the part of the *Repository*, which must have been issued in the previous month, if not earlier, but it affords a useful approximation. The numbers of parts 128 to the end are taken from the wrappers of vol. x in the Banksian Library.

No. of part.	No. of plate.	Name.	*Monthly Magazine.*	
[97]	468	Aloe arborescens	Aug.	1807.
[98]	473	Yucca gloriosa	Sept.	,,
99	478	Crinum latifolium	Nov.	,,
[100	483	Dahlia pinnata	Not noticed].	

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* The author of these Reports, which do not appear to have been recently consulted, was Samuel Frederick Gray; they present interesting features which I hope to make the subject of a future note.

No. of part.		Name.	*Monthly Magazine.*
[101]	488	Broussonetia papyrifera	Dec. 1807.
[102]	493	Bignonia grandiflora	Jan. 1808.
[103]	498	Hibiscus pruriens	March ,,
[104	503	Nymphæa rubra	Not noticed].
[105]	508	Cereus grandiflorus	April 1808.
[106]	513	,, hexagonus	May ,,
107	518	Magnolia grandiflora	June ,,
[108]	523	Gorteria Pavonia	July ,,
[109]	528	Ornithogalum elatum	Aug. ,,
[110]	533	Cactus coccinellifer	Sept. ,,
111	538	Vanilla planifolia	Dec. ,,
112	543	Protea speciosa	May 1809. The contents of 115–6 are not enumerated but their existence is mentioned.
113	548	Cucumis Dudaim	
114	553	Lobelia assurgens	
115	558	Ferula persica	
116	563	Mimosa elegans	
117	568	Liparia sphærica	Sept. 1809. Nos. 117–8 had had been delayed by bookseller.
118	573	Magnolia auriculata	
119	578	Ægiphila diffusa	
120	583	Lonicera japonica	Dec. 1809.
[121–7]	587	Corchorus japonicus to	Sept. 1810 (six numbers).
	612	Pæonia albiflora	
	613	Ipomæa pendula	Jan. 1811.
128	618	Anneslea spinosa	June ,,
129	623	Ardisia elegans	
130	628	Clerodendrum pyramidale	
131	633	Liatris odoratissima	
132	637	Trichilia odorata	Nov. ,,
133	641	Prostanthera lasianthos	Dec. ,,
134	646	Protea radiata	March 1812.
135	651	Cymbidium Andersonii	July ,,

Numbers 136 (tt. 655–59) and 137 (tt. 660–64) which completed the work, are not referred to in the *Monthly Magazine*, and only one—657—is dated (1812). The concluding part was not issued before 1814, as the last plate was drawn in March of that year: Lowndes (ed. Bohn) gives 1815 as the final date for the work, and probably had some sufficient reason for this. It will thus be seen that the tenth volume (tt. 609–664) extended over at least five years, and there are other indications, such as the increase in price, that during that period the *Repository* was in a moribund condition.

The Text.

When my former note was written, I was of opinion that Andrews himself had little part in the descriptive portion of the work. A careful examination of the whole, however, leads to the conclusion that, save for not inconsiderable exceptions to be detailed later and possibly of others which I have not been able to ascertain, Andrews was responsible for the descriptions both in Latin and English. The former are usually brief, in the style of those in his *Geraniums*, of which, in the introduction to that work, he distinctly claims authorship. Salisbury, who was accustomed accurately to attribute descriptions in magazines to their actual authors, cites "Andrews" for most of those he quotes from the *Repository* later than the fifth volume, up to which period, as we shall see, they were undertaken by John Kennedy. These descriptions, as well as the various notes defending the conclusions of Linnæus and the older botanists against those of more recent writers, seem to show that his botanical knowledge was considerable, but it must be admitted that his contemporaries held it in low esteem. In the *Annals of Botany* (i. 17 : 1804) Sims refers to the *Repository* as "a work where the author struggles, with considerable success, to compensate for the total absence of science," and, referring to the *Review of the Plants hitherto figured in the Botanists Repository* (published anonymously but known to be by Gawler, afterwards Ker, in 1801), says that "the author's scientific knowledge enables him to correct the misnomers" of the *Repository*. This *Recensio*, as the work was also called, includes only vols. i and ii of the *Repository*; Gawler, apparently unaware of this, attaches "A" to the descriptions he quotes from it. The writer of the botanical articles in the *Monthly Magazine* (1807–1812) frequently comments on Andrews's lack of knowledge; Smith (*Exotic Botany*, i, 81) is also critical of Andrews, both as to his botany and his want of education: the latter defect is obvious not only in his controversial style, of which Smith cites an example, but in such instances as his implication (Rep. t. 198) that *Bauera rubioides* was so named from its resemblance to a *Rubus*—a statement which Sims (Bot. Mag. t. 715) corrects, with a sarcastic allusion to Andrews's "usual accuracy." The relations between Andrews and Gawler, as well as between Andrews and Sims, were always strained, as is indicated in various passages in Bot. Mag., which Sims then edited, with Gawler as a constant contributor. Thus Sims (Bot. Mag. t. 533) refers to "the carelessness of authors quoting false synonyms," with evident allusion to Andrews, and at the same time pays a high compliment to Gawler: Andrews in his next number (t. 192) makes a long and violent attack upon the *Botanical Magazine*, in the course of which he refers to Gawler as "a person whose knowledge of living plants, we fear, does not lead him, scarcely, to an acquaintanceship with the difference of face in a plane from a poplar." It should perhaps be remembered that the *Botanical Magazine* and the *Repository* were to some extent rival publications.

That Andrews was not unconscious of his defects may be inferred from the Introduction to his *Coloured Engravings of Heaths* (1794–1830), which was in some respects his most important work. The title-page specifically asserts his responsibility for "the whole," including "the appropriate specific character . . .

in Latin and English"; but the Introduction says: "The Latin Descriptions will be given by Mr. Wheeler, Demonstrator of Botany to the Company of Apothecaries; who has kindly undertaken that part of the work: the English translation is as literal as possible." In view of this specific information, it may fairly be argued that the species first described in this work should be cited as of Wheeler.

With regard to the co-operation of others in the descriptive portion of the *Repository*, Andrews himself, in the Introduction to his *Geraniums* (1805), supplies definite information as to the first six volumes. Having said that in this work the author "walks alone," he continues: "But in the descriptions of five volumes of his *Botanists' Repository* he was assisted by gardeners and cultivators; and in the sixth and last volume by a botanist whose opinions were diametrically opposite to those of the former." The five volumes, as was generally known at the time, were the work of John Kennedy (1759–1842), Andrews's father-in-law, a partner in the firm of Lee and Kennedy, from whose nurseries at Hammersmith the plants figured in the earlier volumes of the *Repository* were mainly derived. Were it not for Andrews's definite reference to "gardeners and cultivators" as assisting in the descriptions, one would conclude that the five volumes were entirely the work of Kennedy, and notwithstanding that reference I am inclined to think that such was the case—Salisbury, in the numerous references to these volumes in his various works, cites no other authority. Kennedy, who was evidently a capable man, seems to have been willing to place his services at the disposal of others; it is understood that he was the real author of *Page's Prodromus* (1817), a catalogue of the plants of the Southampton Botanic Gardens which, according to the title-page, was "compiled and adjusted . . . by William Bridgewater Page, from the Hammersmith Nursery": this, although mainly a catalogue (and a very good one), has specimen descriptions at the end, "to assist the yet unlearned botanist." Kennedy's connection with the *Repository* is mentioned by Smith in the "addenda" to Rees's *Cyclopædia*: "*Kennedia*, so named in honour of Mr. Kennedy, the well-known cultivator of Hammersmith, whose skill and experience have so much enriched the works of his son-in-law, Mr. Andrews."

The authorship of the sixth volume was announced by Andrews in a notice, issued with its first part, which is preserved in the Kew copy of the *Repository*: this runs:—

> "Mr. Andrews begs leave to inform his subscribers that the Letter-Press of the Botanists' Repository will, in future, be conducted by his friend Mr. Haworth of Little Chelsea; a gentleman well and practically versed both in the science of Botany and the knowledge of Horticulture, and who has access to some of the first sources of botanical information in this country. Neither pains nor expence will be spared, in any department of the Work, in endeavouring to make it as worthy the attention of the Public as possible."

The text presents a marked contrast with that of the preceding volumes; a full Latin description is in many cases given, sometimes original and in those instances occasionally signed "H," at others cited from Jacquin and other botanical authorities, to whom references are made throughout. It would appear however that Andrews was still responsible for a certain portion of the letterpress, notably for that relating to Geraniums and, judging from the style, for much of the popular English descriptive matter. The improvement did not fail to attract the notice of Salisbury, who, writing in 1805, says that Haworth "has lately written, in a much more able manner than it had been done before, the letter-press of the *Botanists' Repository*, a periodical work which we are sorry on that account to find now given up."* From this remark, and from Andrews's own reference (already quoted) to "the sixth *and last* volume," it would seem that the resumption of the work was not anticipated; and this view finds support in the fact that in the Banksian copy in the British Museum the contents of the six volumes were rearranged in Linnean sequence in four (two of text and two of plates) by Dryander, who compiled a MS. index as if for a complete work. Be that as it may, the first part of vol. vii was not issued until 1806, probably in December, thus leaving a gap of nearly two years. The wrappers of the work would probably explain the circumstances under which the publication of the *Repository* was resumed, but these I have unfortunately been unable to find: the botanical notices in the *Monthly Magazine*, which supply much information as to periodicals, did not begin until July, 1807.

The first number of vol. vii contains a description (*Protea canaliculata*, t. 437) which is assigned by Salisbury (Knight Prot. 46) to Haworth, who himself (Suppl. Pl. Succ. 36) claims that of *Yucca gloriosa* (t. 473); it may be assumed that these had been prepared during Haworth's editorship. The botanical supervision of this and of the succeeding volumes was undertaken by George Jackson, of whom some account is given in this Journal for 1886, pp. 137-9; the portions of that notice which relate to his connection with the *Repository* may be repeated (and in one point corrected) here. Jackson was curator of Lambert's Herbarium, to which reference is made in the *Repository* (t. 438, etc.); many of the drawings for the later volumes were made from living plants sent by Lambert. The first reference I have found to a description by Jackson is that of Salisbury (Trans. Hort. Soc. i, 290) to *Serapias cordigera* (t. 475), but there can be no doubt, from the frequent citation to Lambert's Herbarium, that most of the work in these later volumes was done by him. It may well be that his death in January, 1811, contributed to the final cessation of the *Repository*, which from that date until its conclusion in 1814–15 appeared very irregularly.

For Jackson's connection with the *Repository* there is ample contemporary evidence. The writer of the "Monthly Botanical Report" in the *Monthly Magazine* for September, 1809, expresses himself "much better satisfied with the manner in which this work has been conducted of late than we formerly were: an alteration we are inclined to attribute to the frequent intercourse the author must necessarily have with Mr. Lambert, from whose communications a large proportion of the figures have lately been drawn." A year later (September, 1810) a similar compliment to the text is accompanied by a severe attack upon Andrews's plates: "The letterpress continues to be much better conducted than it formerly was: the assistance of a good botanist is very evident; and as we observe that a large portion of the specimens are supplied from Boyton, our former surmise that this improvement may be attributed to the author's connexions with A. B. Lambert Esq. is strengthened. We wish we could add that the style of drawing was improved, but the artist continues apparently to make Chinese paper-hangings his great model. If he would endeavour to copy accurately the plant before him, he would not so constantly outstep the modesty of nature. If his pictures were less striking to the vulgar eye, that always delights in gaudy tints, they would be infinitely more prized by those who know how to appreciate the excellencies of the art." Smith, in Rees's *Cyclopædia* (xviii, part 2, Aug. 11, 1811), under *Jacksonia*, refers to Jackson's then recent death and says: "The improved style of the *Botanical* [sic] *Repository*, for some time past, though far short of what he would have wished, is owing to his care." Salisbury (in Trans. Hort. Soc. i, 295, 1812), implies his responsibility for the work by indicating its absence in a particular instance*; and Haworth, who preceded Jackson as editor of the *Repository*, has a similar implication.†

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* Ann. Bot. ii, 156 (June, 1805).

It may thus fairly be assumed that Jackson, up to his death, in 1811, exercised a general supervision over the botanical portion of the work, but it is clear that Andrews was also largely responsible for its contents; the *Proteaceæ*, for example, are assigned by Salisbury to him. Other contributors of individual descriptions are indicated in the following list, which I have compiled from such incidental references as I have been able to find in contemporary literature. I have not cited those attributed to Andrews, as he must of course stand as the authority for all the names first published in the *Repository* (in accordance with Article 40 of the Vienna Code) as Aiton does for those in the *Hortus Kewensis*.‡ It may be noted, however, that although this attribution is general, contemporary writers sometimes cite the work simply as "Bot. Rep." The accurate Dryander differentiates in his method of citing this and other works; thus in Ann. Bot. ii, 504–532 he always writes "Andrews's reposit," but "Sims in Bot. Mag.," "Smith in Linn. Soc. transact.," "Smith new Holl.," which seems to suggest that Andrews's relation to the work was regarded as peculiar. Nor does it seem necessary to cite the references to Kennedy in connection with the first five volumes, as his responsibility for these has already been shown.

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* See later, p. 246.

† Synopsis Pl. Succ. 223 (1812). In Journ. Bot. *l. c.* I have referred to the animus displayed by Haworth against Jackson, which may possibly account for his attribution to the former of *Verea acutiflora* (t. 560) to Kennedy, whose connection with the *Repository* had ceased five years before.

‡ See Journ. Bot. 1912, Suppl. iii, p. 7.

The references other than those to Andrews and Kennedy are mostly derived from Salisbury's publications, among which I include Knight's *Proteēæ*, the botanical portion of which is doubtless rightly attributed to him.* In matters of this kind, as indeed whenever personal animosity is not concerned, Salisbury was, as I have shown elsewhere,† very accurate, and his attributions are the result of actual knowledge. It is, however, somewhat strange that although the names quoted in the *Proteēæ* are usually attributed to Andrews, a few, as will be seen, are credited to Haworth.

Vol. VI.

Tab.			
365	Scilla siberica (*sic*) ...	Haw.	Haw. Suppl. Pl. Succ. 80, n.
376	Neottia minor... ...	Kenn.‡	Salisb. in Trans. Hort. Soc. i, 291.
388	Mesembryanthemum inclaudens	Haw.	Haw. Syn. Pl. Succ. 295. Description signed H.
391	Nymphæa Lotus ...	Blandf.	Text accompanying plate.
408	Dahlia pinnata ...	Haw.	Salisb. in Tr. Hort. Soc. i, 91.
414	Larochea falcata ...	Haw.	Haw. Syn. Pl. Succ. 50.
421	Renealmia calcarata ...	Haw.	("How") Salisb. in Tr. Hort. Soc. i, 281.
429	Protea incurva ...	Haw.	Knight Prot. 17.

Vol. VII.

437	Protea canaliculata ...	Haw.	Knight Prot. 46.
473	Yucca gloriosa ...	Haw.	Haw. Suppl. Pl. Succ. 36.
475	Serapias cordigera ...	Jacks.	Salisb. in Tr. Hort. Soc. i, 290.

Vol. VIII.

501	Hellenia Allughas ...	Jacks.	Salisb. *op. cit.* 281.
521	Eriospermum folioliferum	Jacks.	Salisb. Gen. 15.
528	Ornithogalum elatum	Jacks.	,, ,, 29.
532	Veronica Derwentia ...	Littlejohn	R. Br. Prodr. 434.
538	Vanilla planifolia ...	Lambert	Salisb. in Tr. Hort. Soc. i, 295.
540	Mesembryanthemum heterophyllum	Jacks.	Haworth Syn. Pl. Succ. 221.

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* See Journ. Bot. 1886, 297.

† Journ. Bot. 1912, Suppl. iii, 4.

‡ But the description is signed "H." = Haworth.

Vol. IX.

Tab.			
556	Pancratium amœnum	Jacks.	Salisb. in Tr. Hort. Soc. i, 339.
560	Vereia acutiflora ...	Kenn.	Haworth in Phil. Mag. n.s. vi, 303 (1829)
586	Lilium speciosum ...	Jacks.	Salisb. in Tr. Hort. Soc. i, 333.
605	Peliosanthes Teta ...	Jacks.	Salisb. Gen. 63.*

Vol. X.

626	Geodorum citrinum ...	Jacks.	R. Br. in Ait. Hort. Kew ed. 2. v, 297.
634	Peliosanthes humilis ...	Jacks.	Salisb. Gen. 63.†
640	Heliconia Bihai ...	Jacks.	Salisb. in Tr. Hort. Soc. i, 273.
649	Alstroemeria edulis ...	Lamb.	Salisb. in Tr. Hort. Soc. i, 332.

It will be noticed that three names appear in the above list besides those already mentioned. The Marquis of Blandford (1766–1840), afterwards fifth Duke of Marlborough, is especially mentioned in the text accompanying t. 391 (*Nymphæa Lotus*) as having contributed "the description of this very interesting plant, accompanied by a fine living specimen from his splendid collection at White Knights near Reading, Berks." The "description" probably, however, refers only to the English portion which identifies the plant with the Egyptian Lotus. The Marquis was a liberal contributor of specimens to the *Repository*, and t. 343—representing *Galax aphylla* L.—was named *Blandfordia* in his honour, "as few at present patronize the science, through all its branches, with so much vigour and liberality, or have equal knowledge in its theory and practice." It was from living plants in the extensive collection at White Knights that the drawings made for Andrews's *Coloured Engravings of Heaths* (see introduction) were made. Smith, who had named after him the beautiful liliaceous genus *Blandfordia*, which is still retained, speaks of him (in the Addenda to Rees's *Cyclopædia*) as "one of the most ardent botanists and cultivators that this country ever possessed in any rank of life."

Veronica Derwentia (t. 531) is attributed to "Littlejohn" by Robert Brown (Prodr. 434) who substitutes for this odd name (referring to the growth of the plant by the river Derwent) *V. labiata*; the original name is however restored by Bentham (Fl. Austral. iv, 507) who cites it as of Andrews, and adds in a note: "R. Brown does not state for what reason he rejected Andrews's older name, which he quotes as given by Littlejohn, probably from private information. This, however, can scarcely be recognised, as it does not appear to have been previously published, nor is Littlejohn referred to by Andrews in the *Repository*." I have found no other printed reference to Littlejohn: in Cunningham's MS. Journal in the Department of Botany, dated Jan. 1819, is "a list of seeds presented me by His Hon. Lieut.-Governor Sorele, from the Royal Botanic Garden at Kew, collected in the vicinity of Hobart Town, Van Diemens Island, by the late Mr. Littlejohn." This contains 44 numbers, with brief descriptions of plants which must be by Littlejohn, as Cunningham only received the seeds. This is all I know about him.

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* Number of plate misquoted as "525." See Rees, Cyclop. s.v. *Peliosanthes*.

† See Haworth, Rev. Pl. Succ. 102, for a further note on this plate.

The descriptions of tt. 538, 649, are attributed by Salisbury to Lambert (1761–1842). With regard to the former, it may be the case that Lambert wrote the Latin diagnosis, but the English letterpress can hardly be his, as it refers to him in the third person. On the face of it it would appear to have been written by Jackson, as reference is made to a drawing in Lambert's collection, but according to Salisbury, whose *Paradisus* is criticised therein, this was not the case; he writes: "That late excellent botanist, Mr. Jackson, who had the care of Mr. Lambert's Herbarium, was so hurt upon seeing this paragraph that he called immediately to assure me he was not the author of it" (Trans. Hort. Soc. i, 295).

James Britten.

SHORT NOTES.

Carex basilaris (Journ. Bot. 1916, p. 141).—As Mr. Druce has not said if he has specimens of this sedge from Costebelle, we must conclude that his casual record in Journ. Bot. 1907, p. 211, cannot be confirmed. Mons. Alfred Reynier of Toulon, whose knowledge of the plants of Provence is unrivalled, writes: "The record of Mr. Druce at Costebelle, near Hyères, for *C. basilaris* is suspicious (*suspecte*). It is probable that this plant is found in the Var only on the Col du Lentisque (Esterel massif). In the Dept. of les Alpes-Marit., outside of the mountainous region where Mons. Burnat had not seen the said Carex, there is the undoubted station at Cannes, since Jordan himself discovered it at Cap Croisette, and several botanists have found it in this place. As for Menton . . . . Huet and Jacquin sent specimens thence to Honoré Roux." Mr. Bicknell writes that he has not seen *C. basilaris* for a long time, because he has not made spring excursions in places where it is likely to grow. It used to grow abundantly near Menton, but he "should hardly call those sandy, rocky hillsides '*bois frais*,' with their usual maquis plants of Cistus, Erica, etc. Nor, as far as I remember, is the place in *my* district [Bordighera], high above Taggia, *bois frais*—chestnut trees and the usual plants growing under trees. I always used to think *C. basilaris* looked a strong *C. Halleriana* with broader leaves and larger spikelets, but never to be confused with it and recognisable immediately;

but they grow together, if I remember right. . . . *C. œdipostyla*, so abundant above Cannes and all that region, but which I have not found in my district, has pédoncules basilaires." As Mr. Druce spoke of "Costobelle, Alpes Maritimes," was the mistake, after all, one of the place and not of the department, as I naturally supposed? Mr. F. Raine, of Hyères, was also quite unaware that *C. basilaris* had been seen at Costebelle. In regard to the term "bois frais," used by Rouy, Coste, Ardoino and others, it is of course relative; for in the Mediterranean region what would be considered fresh, green, or even moist, might not in this country. H. S. Thompson.

[Mr. Druce informs us that his specimens of foreign sedges (including *C. basilaris*) were all named by Kükenthal, and that several of those sent to him have not been returned.—Ed. Journ. Bot.]

Helleborine viridiflora in Anglesey.—I found this plant on June 24th on the extensive sandhills of Newborough Warren, Anglesey. It occurs in exactly the same kind of habitat as on the Lancashire dunes, namely, on dry dunes among *Salix repens* (see Journ. Bot. 1913, p. 343). At the time of my visit the plant was not fully in flower. It seems to occur only sparingly, a few examples in two different parts of the warren being all that were seen. *Listera ovata* grew with it in one spot, and, apart from these two, no other species of orchid was seen on the dunes. In Griffith's *Flora of Anglesea and Carnarvonshire* Newborough Warren is given as a station for *Epipactis latifolia*: the record will doubtless refer to the plant forming the subject of this note.

W. G. Travis.

BOOK-NOTES, NEWS, &c.

In *The Practical Principles of Plain Photomicrography* Mr. George West (pp. x + 146, 8 plates, 5 figs. in text) gives a very sound account of photomicrographical methods. The Woodwardian system, in which a camera is unnecessary, is particularly interesting. The microscope is placed in a light-proof chamber through a hole in the wall of which the tube of the instrument projects, the plate being in a dark room where the exposure is made and the plate developed. The book would have gained if it had been arranged less like a puff for makers of instruments for microscopy: there is also a lot of talk quite away from the subject suggested by the alliterative title. Feeble and antediluvian jokes are also somewhat prevalent, and one chapter is headed "Dialogue on the making of a photomicrograph between Old Surefoot and Young Castlebuilder." The author prints an "Open Letter to Diatomists," in which he states that he has in hand a publication on the *Diatomaceæ* of Scotland, in which every species will be described, discussed, and illustrated: the first part will be ready by the end of the year. A number of microscopical slides will be issued to illustrate the species. It is also intended to publish a genus index to Schmidt's *Atlas der Diatomaceen-Kunde* to the last plate published and a complete species index to the same work, from the last part included in Fricke's *Verzeichnis* to the most recent issue. The price of the former will be 2*s.*, that of the latter 5*s.*, if twenty persons are prepared to order them. He also solicits orders for a more or less complete bibliography of the *Diatomaceæ*, the price of which will be according to the number of subscribers. *Practical Principles* is published by the author (University College, Dundee), price 4*s.* 6*d.* net. J. R.

In view of the importance attaching to the development of the herb-growing industry, attention may be drawn to the very useful pamphlet on *Medicinal Herbs : their Cultivation and Preparation in Great Britain* (Wesley & Son, price 6d.), by Mr. E. M. Holmes, extracted from vol. xlii of the Royal Horticultural Society's Journal. Such a pamphlet, written by a competent authority, is the more needed in that the information circulated by well-intentioned folk is sometimes inaccurate and even misleading—thus a list of "Wild Herbs which might be collected," issued by the Herb-Growing Association, includes the North American *Scutellaria lateriflora*, and the pamphlet throughout abounds in astonishing misprints—*e.g.* "Majoram (Sweet), Origanuon Majoramum."

The second edition of *Potter's Cyclopædia of Botanical Drugs and Preparations* bears on its title-page the names of Messrs. E. M. Holmes and R. C. Wren. The botanical portion having been supervised by the former, who has also supplied a glossary of botanical terms and "descriptions of the distinctive character of each drug," it may safely be assumed that the work is both useful and accurate: there is also a very full index of names which are somewhat oddly classified: "Common Names are in Capitals, as in ACACIA: Botanical Names are in Italics, as in *Acacia Catechie*: Synonyms are in Roman type, as in Adderwort." There are some odd things among the "abbreviations of names of authors": "Cyrill." assuredly does not refer to "Cyrillus, Patriarch of Alexandria," who flourished in A.D. 444 and was not, so far as we are aware, a botanical writer, and "*James* Dalton Hooker" is unknown to us. The book, which is well printed, and contains nearly 400 pages, is published by Potter & Clarke, Limited, 60 Artillery Lane, London, E.: no date appears anywhere and the price is not stated.

Through the generosity of Lord Rothschild the Department of Botany of the British Museum has acquired a series of 250 drawings of cultivated plants by Worthington G. Smith. The drawings, which are twice the natural size, are the originals of plates published by the *Gardeners' Chronicle*, and form a valuable and interesting addition to the collection of original botanical drawings in the Department.

ALABASTRA DIVERSA—PART XXVI.

BY SPENCER LE M. MOORE, B.SC., F.L.S.*

(PLATE 544.)

1. GENERA NOVA DUO.

Capitanopsis,

LABIATARUM e tribu OCIMOIDEARUM genus novum.

CALYX brevissime bilabiatus, fructifer auctus necnon papyraceus reticulatusque, labio antico undulato-4-dentato quam posticum integrum multo majori. Corollæ tubus valde abbreviatus, in fauces obliquas subcylindricas expansus; limbus bilabiatus, labio postico parvo bilobo labii antici lobis lateralibus latis lobo intermedio concavo patente. Stamina 4, didynama, declinata, breviter exserta; filamenta libera; antheræ uniloculares. Discus perspicuus, breviter lobatus. Stylus apice bifidus. Nuculæ ovoideæ, sericeæ. —Verisimiliter frutex nisi suffrutex parvifolius. Verticillastri circa 6-flori, ramulos terminantes. Corollæ dilute roseæ.

C. Cloiselii, sp. unica. Foliis breviter petiolatis oblongis obtusis basi paullo angustatis integris papyraceis supra subtiliter pubescentibus subtus minute griseo-tomentellis, inflorescentiæ axi ut pedicelli tomentello, calycis tubo campanulato extus tomentello labio postico suborbiculari labii antici dentibus rotundatis, corollæ extus pubescentis labii postici lobis obovatis obtusissimis labii antici lobis lateralibus rotundatis lobo intermedio cymbiformi, stylo exserto complanato glabro. (Tab. 544, fig. 1.)

Hab. Madagascar, Fort Dauphin; *Cloisel*, 62.

Ramuli sat valide corticati, minute pubescentes dein glabri. Folia plerumque 1·5–2 cm. long., 5–6 mm. lat.; petioli tenues, pubescentes, summum 3 mm. long. Pedicelli sæpissime 2–3 mm. long. Calyx florescens 4 × 6 mm., fructescens 7 × 14 mm., hujus labium posticum 4 × 5 mm., anticum 9 × 10 mm. Corollæ tubus summum 3 mm. long., ægre 4 mm. lat.; fauces 17 × 7 (ipso sub limbo 9) mm.; labium posticum 3 × 4·75 mm.; hujus lobi vix 3 × 2·5 mm.; labii antici lobi laterales 3 × 6 mm., lobus anticus 5 × 3 mm. Filamenta basi dilatata; antheræ 1 mm. long. Stylus 15 mm. long. Nuculæ (anne maturæ?) ·75 mm. long.

This plant has a calyx much like that of *Capitanya*, except for the front lobes of the *Capitanya* calyx being smaller than the rest whereas here it is the hinder lobe which is reduced. The corolla is, however, quite different and closely resembles the corolla of *Alvesia*, with its relatively small front lobe, thus placing it in the neighbourhood of *Plectranthus*, while *Capitanya* is near *Ocimum*. But though it has the corolla of *Alvesia*, *Capitanopsis* has nothing in common, except accrescence, with the equally 2-lipped calyx of the other which becomes a sort of inflated bag as it matures.

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* The types of species described in this memoir are in the National Herbarium.

Megalostylis,

Euphorbiacearum e subtribu Plukenetiearum, genus novum.

Flores masc.—sepala 3, æstivatione valvata. Petula et discus 0. Stamina 6; filamenta in columnam cylindricam consolida; antheræ didymæ, biloculares; rud. ♀ 0. Flores fem.—sepala 6, æstivatione imbricata. Discus 0. Ovarium 3-loculare, stylo magno crasso clavato apice integro coronatum. Ovula in loculis solitaria. Fructus ignotus.—Planta monoica, verisimiliter frutex scandens. Folia alterna, ampla, 5-nervia. Flores in cymas axillares breves bracteis cincti digesti.

M. Pœppigii, sp. unica. Foliis longiuscule petiolatis late ovatis obtusis nonnunquam breviter cuspidulatis basi late truncatis brevissimeve cordatis membranaceis utrobique pilis abbreviatis sparsim obsitis, pedunculis petiolis multo brevioribus ut ramuli necnon petioli subtiliter sericeo-puberulis, bracteis ovatis obtusiusculis vel obtusis, sepalis ♂ oblongo-spathulatis obtusissimis quam sepala ♀ ovato-lanceolata brevioribus omnibus ut bracteæ puberulis, columna staminea quam sepala paullo breviore, ovario globoso breviter sericeo, stylo ovarium pluries superante basi sericeo ceteroquin glabro. (Tab. 544, fig. 2.)

Hab. Peru or Brazil (upper Amazon region); *Pœppig, sine no.*

Folia exempl. unici nobis obvii adusque 11 × 9 cm., sæpius vero minora, supra in sicco badio-subtus griseo-viridia; costulæ perspicuæ, horizontales vel fere horizontales; petioli 2·5–4·5 cm. long., graciles. Cymæ in toto 2–2·5 cm. long. Bracteæ 3–4 mm. long. Sepala ♂ 2 mm. long., ♀ usque ad 2·5 mm. Columna staminea 1·8 mm. long., antheræ vix ·5 mm. Ovarium diam. 1 mm. paullulum excedens; columna stylaris 8 mm. long, paullo curvatus.

This genus differs from *Plukenetia* in the involucrate inflorescences, the trimerous male flowers with few stamens on a slender column, didymous not tetradymous anthers and the entire style. *Angostylis*, with a trimerous calyx to its male flowers and didymous anthers, has exinvolucrate flowers, the males with numerous stamens, the females with a well-developed stigma.

2. Plantæ Africanæ novæ vel rariores.

Rubiaceæ.

Oldenlandia Duemmeri, sp. nov. Verisimilter perennis caulibus e rhizomate satis valido cæspitosis tenuibus superne ramosis ramis distanter foliosis scabriusculis mox glabris, foliis parvis sessilibus sæpe ad basin ramulorum floriferorum quasi-verticillatis anguste linearibus apice pungentibus margine revolutis scabriusculis, stipulis abbreviatis 2–3-setosis, floribus parvulis in cymas axillares terminalesve laxas paucifloras dispositis, pedicellis filiformibus flore plane longioribus, ovario hemisphærico glabro calycis lobis (sine dentibus interjectis) 4 deltoideis acutis margine ciliatis æquilongo, corollæ parvulæ hypocraterimophæ tubo calycem excedente satis lato juxta medium constricto glabro lobis ovato-oblongis obtusis tubo paullulum brevioribus, antheris medio tubo insertis, stylo breviter exserto, stigmate bilamellato.

Hab. Uganda, rocky outcrops on tops of hills at Bugoye; *Dümmer*, 2624.

Tota planta spithamea vel paullo altior. Rhizoma lignosum, aliquanto nodosum, 4–5 mm. diam. Caulis ·5 mm., ramuli ultimi ·25 mm. lat. Folia pleraque 5–8 mm. long., sicca ob margines revolutos vix unquam 1 mm. lat., humutata vero interdum 1 mm. paullulum excedentia. Stipularum pars indivisa circa ·5 mm. long.; harum setæ 1–1·5 mm. long. Ovarium ·75 × 1 mm. Calycis lobi ·75 mm. long. Corollæ albæ tubus 2 mm. long., basi 1 mm., medio ·75 mm., faucibus 1·25 mm. lat. Antheræ late oblongæ, ·5 mm. long. Stylus 2·5 mm. long. Capsula pallida, 4-costata, 1·5 mm. diam.

Easily recognised by the narrow pseudoverticillate leaves and the small flowers and capsules. Its affinity is with *O. Heynei* Oliv.

COMPOSITÆ.

Erlangia (§ *Platylepis*) **Buchananii,** sp. nov. Caule ramoso ramulis foliosis cinereo-tomentosis, foliis parvis alternis breviter petiolatis summis sessilibus oblongo-lanceolatis acutis basi obtusis rotundatisve supra laxe pubescentibus subtus cinereo-tomentosis, capitulis parvis campanulatis circa 25-flosculosis in cymam laxam oligocephalam digestis, pedunculis propriis capitula nullo negotio excedentibus tomentosis, involucri 3–4-serialis phyllis lanceolatis apice apiculatis dorso pilosis margine scarioso-membranaceis necnon ciliatis intimis longioribus margineque glabris, flosculis exsertis, achæniis minutis oblongo-turbinatis paucicostatis puberulis, pappi setis perpaucis breviter barbellatis caducissimis.

Hab. British East Africa; *Lieut. A. Buchanan.*

Folia 2–3 cm. long., 6–8 mm. lat.; petioli summum 3 mm. long. Inflorescentia 7 × 6 cm.; hujus bracteæ foliis similes sed minores. Pedunculi proprii graciles, solemniter 1–2 cm. long. Capitula pansa 8 × 8 mm. Involucri phylla extima 2 mm., intermedia 3 mm., intima 4 mm. long. Flosculi dilute purpurei; corollæ tubus anguste infundibularis, extus papillosus, fere 3 mm. long.; lobi oblongi, 2 mm. long. Andrœcium exsertum. Styli rami 2 mm. long. Achænia longit. 1 mm. paullulum excedentia. Pappi setæ 1–1·5 mm. long.

Affinity with *E. boranensis* S. Moore but with leaves different in some respects and smaller involucral leaves without lacerate edges. The general appearance is much like that of a *Gutenbergia.*

Vernonia (§ *Lepidella*) **campanea**, sp. nov. Verisimiliter perennis superne ramosa ramis teretibus striatis dense pubescentibus deinde puberulis, foliis petiolatis oblongis vel oblongo-ovatis basi apiceque obtusis margine undulatis supra sparsim subtus dense pubescentibus, capitulis parvis circa 17-flosculosis in paniculam magnam elongatam e cymis pluribus scorpioideis pleiocephalis compositam digestis, bracteis infimis foliis similibus etsi multo minoribus junioribus linearibus gradatim imminutis, involucri campanulati piloso-pubescentis phyllis 4-seriatis lineari vel oblongo-lanceolatis acutis apice fuscis, flosculis exsertis, achæniis subcylindricis basi prominenter callosis rectis vel curvatis 5-costatis angulatisque inter costas pilosulis glandulisque microscopicis paucis lucentibus præditis, pappi squamis anguste linearibus setis levibus albis.

Hab. Uganda, 100 miles N.W. of Kampala; *E. Brown* (*Dümmer* 2652).

Folia 3–6 cm. long., 1·2–2·2 cm. lat., firme membranacea, supra in sicco fuscescentia subtus grisea; petioli usque ad 8 mm., dense pubescentes. Panicula adusque 30 × 16 cm.; hujus rami ascendentes, inferiores fere 10 cm. long., omnes dense sed breviter pubescentes. Cymæ plerumque 5–6 cm. long., totidemque lat. Involucri phylla extima 1·5–2·5 mm., intermedia 3·5–4 mm., intima 6 mm. long. Corolla 8·5 mm. long., hujus tubus basi brevissime angustatus; lobi extus minute pellucido-glandulosi. Styli rami exserti, 2·25 mm. long. Achænia 1·25–1·5 mm. long. Pappi squamæ 1 mm., setæ 6 mm. long.

The stalked leaves obtuse at base, broader outer involucral leaves, and smaller, angled achenes afford the best means of distinguishing this from *V. usambarensis* O. Hoffm.

Vernonia (§ *Stengelia*) **Brownii,** sp. nov. Caule erecto valido sursum sparsim ramoso ut rami primo ochraceo-tomentoso deinde pubescente, foliis petiolatis lanceolate-obovatis basi apiceque obtusis margine calloso-dentatis supra mox scabriusculis subtus tomentosis, capitulis submediocribus circa 20-flosculosis in paniculam polycephalam sublaxam foliis longiorem tomentosam dispositis, involucri campanulati pilosuli phyllis 4-seriatis exterioribus abbreviatis oblongis interioribus oblongo-ovatis omnibus appendice membranacea phyllorum extimorum filiforme ceterorum oblonga obtusa præditis, corollis exsertis, achæniis subcylindricis basi callosis 10-costatis inter costas pubescentibus, pappi setis levibus sordide stramineis.

Hab. Uganda, savannah 100 miles N.W. of Kampala; *E. Brown* (*Dümmer* 2656).

Folia ± 5 cm. long., 2–3 cm. lat., firme membranacea, in sicco supra olivaceo-fusca subtus ochraceo-grisea; petioli 5–10 mm. long. Panicula circa 15 × 12 cm.; hujus rami ascendentes, plerumque 2–4 cm. long. Pedunculi proprii summum 3 mm. long., sæpius vero etiam breviores. Capitula pansa 12 × 10 mm. Involucri phylla extima 3–4 mm., intermedia 6 mm., intima 8 mm. long. Corolla 9·5 mm. long.; tubus inferne filiformis, superne subito usque ad 1·2 mm., dilatatus. Styli rami exserti, 3 mm. long. Achænia matura basi levissime angustata, brunnea, 2 mm. long. Pappus 7 mm. long.

This is very near *V. Kaessneri* S. Moore, but its involucres are different, having narrower leaves with a more pronounced appendage. The corollas too are shorter and differently shaped, while the achenes are broader and more markedly ribbed.

Vernonia (§ *Stengelia*) **dumicola,** sp. nov. Fruticosa, ramosa, ramulis validis striatis griseo-velutinis deinde glabrescentibus, foliis breviter petiolatis oblongo-oblanceolatis obtusis basi gradatim angustatis margine dentatis membranaceis supra subtiliter puberulis subtus griseo-tomentosis, capitulis mediocribus circa 25-flosculosis paniculam corymbosam pleiocephalam folia facile superantem constituentibus, involucri campanulati 5-serialis phyllis oblongo-ovatis crustaceis appendice lanceolato-oblonga acuta rosea vel roseo-brunnea onustis margine ciliolatis extimis imminutis dorso puberulis, flosculis exsertis, corollæ tubo filiformi sub limbo dilatato, achæniis subcylindricis basi callosis paucistriatis pubescentibus, pappi setis 3-seriatis leviter scabriusculis dilute stramineis paucis exterioribus brevioribus.

Hab. Uganda, in thickets at Kirirema; *Dümmer*, 84.

Folia pleraque 5-8 cm. long., 10–23 mm. lat., pagina utravis glandulis paucis lucentibus pilis intermixtis obsita; costæ laterales utrinque parum aspectabiles. Panicula velutina, circa 15 × 10 cm.; hujus bracteæ plerumque lineares, ± 3 mm. long.; pedunculi proprii ± 5 mm. long., crebro bracteati. Capitula pansa 9 × 9 mm. Involucri phylla extima 2–3 mm., intermedia 5 mm., intima 7–7·5 mm. long. Corollæ dilute purpureæ; tubus minute glandulosus, 8 mm. long.; pars dilatata 3 mm. long.; lobi 2 mm. long. Andrœcium exsertum, styli rami fere 2 mm. long.

This also is very near to *V. Kaessneri* S. Moore, but with narrower leaves, more open inflorescences with smaller flowering heads, broader purple-tipped involucral leaves and shorter corollas with a broader dilated upper portion.

Aster (*Diplopappus*) **milanjiensis**, sp. nov. Herba circiter sesquispithamea, caule ascendente simplici sat debili in longitudinem striato cito glabro, foliis paucis sessilibus anguste lineari-lanceolatis raro vere lanceolatis obtusiusculis obscure nervosis membranaceis præter marginem calloso-denticulatum glabris, capitulis majusculis ∞-flosculosis solitariis terminalibus, pedunculis ultra folium ultimum varie elongatus, involucri late campanulati phyllis 3-serialibus lineari-lanceolatis margine scarioso plus minus ciliatis trinervibus, ligulis circiter 26 ex involucro longe eminentibus, achæniis compressis ovoideo-oblongis sericeo-villosulis, pappi setis paucis exterioribus abbreviatis ceteris elongatis scabridis dilute rubiginoso-stramineis.

Hab. British Central Africa, Mt. Mlanji; *Mrs. Arthur Shinn*, *A. Whyte*, *McClounie*, 58 in Herb. Kew.

Folia 1·5–3 cm. (ultima modo 5 mm.) long., 2 mm. lat. vel paullulum ultra, rarissime 6 mm. attingentia, in sicco grisea. Pedunculi nonnunquam 10 cm. æquantes, sapius vero breviores, sc. 3–4 cm. Capitula pansa circa 2·5 cm. diam. Involucri phylla extima 5–6 mm., intermedia 8 mm., intima 8·5 mm. long. Disci corollæ 4 mm. long. Antheræ basi obtusæ, 1·25 mm. long. Styli rami (incluso cono stigmatico fere æquilongo) 1·25 mm. long. Achænia adhuc cruda 1·25–1·5 mm. long. Pappi setæ exteriores ·5 mm., interiores circiter 4 mm. long.

The small narrow leaves, smooth except at the margin, at once distinguish this from *A. hispidus* (*Diplopappus asper* Less.). *A. serrulatus* (*Diplopappus serrulatus* Harv.) has leaves with a similar margin, but those organs are longer and coriaceous besides being very strongly ribbed.

Sphæranthus tetraphyllus, sp. nov. Herba sesquispithamea glabra, caule ascendente aliquanto compresso sursum ramos paucos crebro foliosos emittente, foliis oblongis vel oblongo-oblanceolatis obtusis deorsum longe decurrentibus margine calloso-denticulatis glandulis immersis sat copiose præditis, capitulorum glomerulis mediocribus sphæroideis, receptaculo communi ovoideo-oblongo, capitulis compressis ambitu ovatis, involucri phyllis 4 quorum extimum majus late obovatum spinuloso-acuminatum cetera oblongo-oblanceolata obtusissima apice ciliata, flosculis fem. 8(7)–10, hermaph. 2 (casu 1).

Hab. Uganda, Uamanyanzi, 4000 ft.; *Dümmer*, 2574.

Folia ± 2·5 cm. long., 3–4 mm. lat., in alam circa 1 mm. alt. integram vel fere integram decurrentia. Glomeruli circa 1 cm. diam. Involucri phyllum ext. 3·5 × 2 mm., phylla reliqua 3 × 1 mm., omnia tenuiter crustacea, decoloria, apice rubescentia. Flosculorum fem. corolla inferne inflata papillosaque, 2·5 mm. long.; flosculorum hermaph. 5-merorum 2 mm. long., sursum amplificata, hujus lobi triangulares, ·4 mm. long. Antheræ 1 mm. long. Stylus exsertus, indivisus, superne geniculatus, 2·25 mm. long. Achænia flosculorum fem. subquadrangularia, hispidula, vix 1 mm. long.; flosculorum hermaph. 1·75 mm. long.

The affinity of this is with *S. suaveolens* DC. although it does not fit into either of O. Hoffmann's sections. *Inter alia* the narrow leaves and 4-leaved involucres with differently shaped involucral leaves serve as points of distinction.

Helichrysum (*Argyreia* § *Elegantissima*) **Brownei**, sp. nov. Suffrutex parvus pauciramosus ramis ascendentibus dense foliosis griseo-cinereo-tomentosis, foliis sessilibus linearibus obtusis margine arcte revolutis utrobique dense griseo-araneoso-tomentosis, capitulis homogamis mediocribus multiflosculosis ad apicem ramorum solitariis breviter pedunculatis, involucri late campanulati phyllis 6-serialibus appendice oblongo-lanceolata acuta radiante argentea vel dilute argenteo-aenea nitente præditis, receptaculo convexo alveolato, flosculis inclusis, achæniis oblongis glabris, pappi setis sordide albis levibus.

Hab. Mt. Kenia, 12-14,000 ft.; *Lieut. Orde Browne.*

Tota planta circa 10 cm. alt. Folia plerumque 8–10 mm. long., 1 mm. lat. vel paullulum ultra, mox patentia. Pedunculi circiter 5 mm. long., araneoso-tomentosi. Capitula 1·5 × 2 cm. Involucri phylla extima 4 mm., intermedia 7–9 mm., intima 12 mm. long. Corollæ flavæ, 3 mm, long. Achænia 1 mm., pappus 5 mm. long.

Close to *H. Newii* Oliv. & Hiern and *H. Hoehnelii* Schweinf. with heads intermediate in size. The foliage clearly marks a chief distinction between these three species.

Conspecific with this, but differing from it in having an inflorescence of several heads, is a Kenia plant gathered by Dr. Gregory at the terminal moraine of sheet glaciation. This is a robuster plant than Lieut. Orde Browne's and stands twice as high. Similar to it is *Hutchins* 383 in Herb. Kew., also from Kenia. (VAR. PLEIOCEPHALA, capitulis pluribus.)

Closely allied to the foregoing but on account of the foliage certainly distinct is—

Helichrysum keniense, sp. nov. Suffrutex humilis, caule ascendente folioso sicut folia tela griseo- (vel dilutissime brunneo-) araneosa arcte involuto, foliis sessilibus breviter decurrentibus oblongo-obovatis (superioribus oblongis) margine planis nigro-mucronatis basi angustatis, capitulis mediocribus homogamis multiflosculosis solitariis terminalibus, involucro, phyllis etc. iis *H. Brownei* similibus.

Hab. Mt. Kenia; *Dr. J. W. Gregory.*

Planta circa 10 cm. alt. Folia profecto evoluta 1·3–1·5 cm. long., 5–6 mm. lat. Capitula 1·5 × 2 cm.

Helichrysum (*Argyreia* § *Elegantissima*) **cruentum**, sp. nov. Herba circiter spithamea a basi ramosa ramis subsimplicibus sursum solummodo pauciramulosis erectis crebro foliosis glanduloso-araneoso-tomentosis, foliis amplexicaulibus ovato-oblongis nigro-mucronulatis integris papyraceis utrinque pubescentibus, capitulis homogamis majusculis multiflosculis ramulos breves singillatim coronantibus, involucri late campanulati circa 6-serialis phyllis exterioribus appendice triangulari-obtusa interioribus appendice longiori lanceolata acuta onustis appendicibus roseis demum radiantibus, receptaculo plano foveolato, flosculis inclusis, achæniis (adhuc maxime crudis) oblongis glabris, pappi setis albis apice ipso pilis perpaucis microscopicis oblongis onustis ceteroquin levibus.

Hab. Mt. Kenia at 8000 ft.; *Lieut. Orde Brown.*

Folia pleraque 2 × 1 cm., in sicco viridia, subtus paullo pallidiora. Capitula pansa 1·5 × 2 cm. Involucri phylla extima 2–4 mm., intermedia 6–9 mm., intima adusque 12 mm. long. Corollæ flavæ, 3 mm. long. Achænia vix 1 mm. long.; pappi setæ 3 mm. long.

The araneose clothing is seen on young parts of the stem. Afterwards there are left only the thickly set glandular hairs. Another of Lieut. Orde Browne's Kenia specimens is in foliage exactly like that just described, but the inner involucral appendages are a little longer and acuminate. Doubtless it is only a form of *cruentum.*

A third specimen, also from Kenia, with narrow araneose leaves and shorter involucral leaves is apparently distinct, but the specimen is not good enough to warrant description.

H. cruentum is the Kenia representative of *H. Meyeri-Johannis* Engl. from Kilimandjaro. The difference between the two concerns chiefly the shape, size and clothing of the respective leaves.

Helichrysum (*Lepicline* § *Plantaginea*) **arctotidifolium**, sp. nov. Herbaceum, subacaule, foliis radicalibus confertis sessilibus lanceolatis mucronatis dimidio axiali gradatim angustatis dimidio abaxiali 3–5 nervibus supra laxe subtus intricate lanato-tomentosis ætate haud glabrescentibus additis paucis scapo affixis in bracteas transeuntibus, capitulis circiter 30-flosculosis scapum lanatum folia plane excedentem terminantibus in cymas paniculiformes breves subcongestas digestis, involucri anguste ovoidei brunnei phyllis 4-serialibus lanceolatis appendice brunnea ovata obtusa scariosa indutis, flosculis omnibus hermaphroditis, achæniis adhuc crudis parvulis cylindricis glabris, pappi setis corollas subæquantibus ima basi connatis scabridis albis.

Hab. Rhodesia, near top of Fairview Mt., near Melsetter, 6000 ft.; *Swynnerton.*

Caulis crassus, circa 1 cm. diam. Folia pleraque 13–15 cm. long., nonnunquam 20 cm. attingentia, 2–3 cm. lat., inferne usque ad 8 mm. angustata; folia in bracteas transeuntia 5–10 cm. long.; bracteæ 1–2·5 cm. long., lanceolatæ, acuminatæ. Scapus alt. 35 cm., tomentosus. Inflorescentiæ circa 2 × 4 cm., hujus rami ± 8 mm. long., tomentosi. Pedunculi proprii 1–4 mm. long. Capitula 5 × 5 mm. Involucri phylla dorso pubescentia glabrave, extima 3·5 mm., reliqua 4·5–5 mm. long. Receptaculi paleæ oblongæ vel oblongo-ovatæ, integræ vel apice denticulatæ. Corolla anguste infundibularis, in toto vix 3 mm. long.; lobi 5, triangulares, extus papillosi. Styli rami truncati, fere 1 mm. long. Achænia ·75 mm. long.; pappus 3·75 mm. long.

The affinity of this is with *H. latifolium* Less., from which it can be distinguished at a cursory view by the differently shaped leaves permanently hairy on both sides.

HELICHRYSUM WRIGHTIANUM, comb. nov, (*H. plantaginifolium* C. H. Wright in Kew Bull. 1901, p. 123, non O. Hoffm.).

Hab. Rhodesia, grazed pasture near Chipete; *C. F. M. Swynnerton.*

Melanthera ugandensis, sp. nov. Caule decumbente sulcato striatoque scabriusculo, ramis tenuibus quadrangularibus foliosis scabriusculis, foliis oppositis raro subоppositis (summis alternis) petiolatis oblongo-lanceolatis acuminatis margine serratis basi obliquis cuneatis trinervibus utrobique scabridis, capitulis parvis longipedunculatis ex axillis superioribus oriundis, involucri campanulati phyllis 2–3-serialibus ovato–lanceolatis acutis coriaceis superne herbaceis scabridis, ligulis circa 13 subinclusis, receptaculi paleis exsertis acuminatis, achæniis nondum maturis oblongo-obtusis, pappi aristis 1–2 (rarissime 3) inter se inæquilongis.

Hab. Uganda, grassland at Uamananzi; *Dümmer*, 2564.

Folia 5–6 × 1·5–2 cm., in sicco grisea subtus griseo-viridia; petioli 3·8 mm. long. Pedunculi graciles, ± 2 cm. long. Capitula pansa 8 mm. diam. Involucri phylla ext. 4–4·5 mm., int. 5 mm. long. Radii flosculi neutri. Ligulæ flavæ, oblongo-obovatæ, trifidæ, 4–5 mm long. Receptaculi paleæ lanceolatæ, dorso superneque scaberrimæ, 5 mm. long. Achænia cruda fere 1 mm. long. Pappi arista major 1·5–2 mm., minor ·5–1 mm. long.

The leaves cuneate at base and the small heads with narrower involucral leaves and small ligules afford an easy means of distinguishing this from *M. varians* Hiern.

Hypericophyllum Gossweileri, sp. nov. Suffruticosum caule simplici valido erecto crebro folioso longitrorsum sulcato scabride pubescente, foliis sessilibus oblongis obtusis basi leviter

amplexicaulibus margine cartilagineis coriaceis utrinque scabridis, capitulis pro rata magnis subsphæroideis ∞-flosculosis oligocephalo-corymbosis vel caulem solitatim terminantibus pedunculis elongatis scabride pubescentibus distanter bracteatis fultis, involucri 4-serialis phyllis ovatis vel late ovato-oblongis (intimis oblongo-lanceolatis) apice mucronatis interioribus gradatim longioribus, corollis breviter exsertis, styli ramis papillosis obtusissimis vix truncatis, achæniis 5-angulatis inferne gradatim angustatis fulvopubescentibus, pappi setis deorsum dilatatis ibique sæpe dentatis apice acuminatis haud uncatis folvo-barbellatis.

Hab. Angola, here and there in grassy meadows between the Kuiriri and Kuito rivers; *Gossweiler*, 3670.

Circiter bispithamea. Caulis deorsum 3–5 mm. diam., sursum paullo angustior. Folia glandulis pellucidis immersis crebro prædita, plerumque 5–6 cm. long., 7–10 mm. lat. Pedunculi summum circa 15 cm. long.; horum bracteæ gradatim diminutæ, summæ 7–9 mm. long. Capitula pansa 3 × 4 cm. Involucri phylla extima 9–13 mm. long., intermedia 17 mm., intima 24 mm. long. Corollarum tubus 11 mm. long.; lobi 2·5 mm. long. Antheræ 5 mm. long. Styli rami 3·5 mm. long. Achænia 10 mm., pappi setæ 16 mm. long.

A somewhat remarkable plant, diverging in the hookless setæ of its pappus from *Hypericophyllum* as established by Steetz, a genus merged by Bentham in *Jaumea* but proposed for reestablishment by N. E. Brown (Journ. Linn. Soc. xxxv. p. 120). Except for this the characters are those of *Hypericophyllum*.

(To be concluded.)

WHAT IS VIOLA MONTANA *L.*?

BY A. J. WILMOTT, B.A., F.L.S.

THIS much-debated problem has been forced to my notice owing to the use of the name for a violet growing in Woodwalton fen in Huntingdonshire. Since a preliminary investigation tended to show that the name should be used not for that plant but for the one usually known as *Viola elatior* Fries, I was led to examine the matter in detail.

The account of *Viola montana* in Linnæus's *Species Plantarum*, p. 935 (1753), is as follows:

"*montana*. 10. VIOLA caulibus erectis, foliis cordatis oblongis.
Viola foliis ovato-lanceolatis, caule erecto, stipulis dentatis. *Roy. lugdb.* 430. *Dalib. paris.* 269.
Viola martia arborescens purpurea. *Bauh. pin.* 199.
Viola erecta, flore cæruleo & albo. *Moris. List.* 2, *p.* 475, *s.* 5, *t.* 7, *f.* 7.
Viola arborescens. *Cam. epit.* 911.
Habitat in Alpibus Lapponiæ, Austriæ, Baldo. ♃."

The first two references—Royen, Flor. Leyd. p. 430 (1740), and Dalibard, Flor. Paris, p. 269 (1749)—are both based primarily on that to C. Bauhin, Pinax, p. 199 (1623). Under Bauhin's name we find a number of references, some of which are vague, others not, but the use of the name itself is not open to doubt. In the herbarium of Sir Hans Sloane preserved in the Department of Botany there are three specimens under this name:

i. H. S. 13, p. 124—a plant given Mr. Courten by Tournefort. This is *V. elatior*.
ii. H. S. 91, p. 186—one of Plukenet's plants. This is the apex of a fruiting branch of *V. elatior*.
iii. H. S. 311, p. 84—one of Uvedale's plants. This is *V. elatior*.

It is thus evident that the name *Viola martia arborescens purpurea* was uniformly used in Linnæus's time for *V. elatior*.

Royen also refers to *V. martia arborescens purpurea* Boerh. Lugd. 1244 (1720). Boerhaave quotes Linnæus's fourth reference (Moris. Hist.—see below) and also "*Jacea tricolor surrectis caulibus quibusdam arborea dicta*," J. Bauh. Hist. iii, 547: 1651). Here we find a good summary of the literature. Bauhin says that he cannot imagine why the plant is called "arborea" or "arborescens," and therefore has not used that name, but he gives a good figure and description of *V. elatior*. He notes that C. Bauhin in his earlier work erroneously referred *V. assurgens tricolor* Dod. and *V. martia surrectis cauliculis* Lobel. to *Tricolor erecta, an Jovis flos Theophrast.*, whereas they belong to his plant (*i. e. V. elatior*). It is interesting to notice that Boerhaave, possibly following C. Bauhin, labelled a plant in his herbarium (H. S. 320, p. 137) with these same three names. The specimen is a form of *V. tricolor* Linn. and is the only specimen in Herb. Sloane bearing as name any of the synonyms cited in the Pinax which is not *V. elatior*.

Before referring to the other specimens in Herb. Sloane we will deal with Linnæus's reference to Morison's Historia (1680). The description and figure refer undoubtedly to *V. elatior*, and the specimen in Morison's Herbarium is also *V. elatior* (see Druce and Vines *The Morisonian Herbarium*, p. 45: 1914). The figures of *Viola erecta flore cœruleo* and *Viola erecta flore albo* in the *Hortus Eystettensis*, Ordo V. fol. 5, figs. ii and iii (1613), are both of *V. elatior*.

Linnæus's last reference to "Cam. epit. 911"—*i. e.* Camerarius's edition (1568) of Matthioli's *De Plantis Epitome*—is cited as a synonym by C. Bauhin, J. Bauhin and Morison, so that it is no wonder that Linnæus also cited it. The figure given is not good. It might be *V. elatior*. The stipules are rather large for *V. Ruppii* All. (et Borbas in Koch's *Synopsis* ed. Hallier, p. 207: 1890), while they do not look as prominent in the figure as one would have expected an artist to make those of *V. elatior*. The locality given is Monte Baldo. This plant is referred by Pollini, Fl. Veron. i, 297 (1822), and Parlatore, Fl. Ital. ix, 155 (1890–1893), to "*V. montana* L.," *i. e. V. elatior*, which they keep distinct from

"*V. Ruppii* All. Flor. Ped. = *V. stricta* Hornem.? Koch et auct." Pollini states that he himself gathered it on Monte Baldo. It therefore seems fair to assume that the plant of Monte Baldo described in "Cam. epit. 911" may well also have been *V. elatior*.

The diagnosis in the *Species Plantarum*—"*Viola caulibus erectis, foliis cordatis oblongis*"—does not help much, since although it fits *V. elatior* perfectly, it does not exclude all the other species.

There are in Herb. Sloane other plants labelled with various of the names in question. They are:

H.S. 83, p. 114—*Viola assurgens tricolor* Dodon. This is a European specimen collected by Plukenet and is almost certainly the apex of a fruiting stem of *V. elatior*.

H.S. 136, p. 47, as *Viola martia surrectis cauliculis. V. erecta coer. & albo* Eyst. *arborescens* Matth. (*i.e.* = "Cam. epit.") This is *V. elatior*.

H.S. 311, p. 82, no. 3—one of Uvedale's plants, as *V. surrecta purpurea* Park., a synonym cited in Ray Hist. This is *V. elatior*.

There are also plants in Sloane's Herbarium which were apparently not named by their collectors, but which Sloane himself identifies as "R.H. 1052, 1," *i. e.* Ray's Historia Stirp. p. 1052, no. 1 (1688), called *Viola surrecta purpurea* Park. *Mar. arborescens purpurea* C.B. *Viola assurgens tricolor* Ger. *Jacea tricolor surrectis caulibus, quibusdam arborea dicta* J.B.

Ray's description is of *V. elatior*, and the specimens thus referred by Sloane—H.S. 102, p. 115, and H.S. 230, p. 6—are also *V. elatior*. Gerard (Herbal. 1597, p. 703) and Parkinson (Theatr. Bot. 1640, p. 755) both figure *V. elatior*.

It thus seems evident that Linnæus's contemporaries would without exception have understood *V. montana* Linn. as being the plant now called *V. elatior* (or the nearly related *V. danubialis*), and it was so understood and used by Allioni, Roth, Decandolle, Lapeyrouse, Gmelin, Besser, etc., and all authors before Wahlenberg.

What then are the reasons given by modern authors in justification of their use of the name *V. montana* for *V. Ruppii?* Becker, *Ber. d. Bayer. Bot. Ges.* viii, 2, 271 (1902), and Burnat and Briquet, *Ann. Conserv. et Jard. bot. Génève*, vi, 143 (1902), give "*V. montana* L. *Flor. Suec.* 305 (1755)" as the name for *V. Ruppii* All. (Borbas), and Rouy and Foucaud (*Fl. France*, iii, p. 10: 1896) quote under *V. elatior* Fr. "*V. montana* L. Spec. Plant? non Fl. Suec.!" This nomenclature is based on the fact that Linnæus gives "Alpibus Lapponiæ" as a locality for his *V. montana* and in the second edition of the *Species Plantarum* cites his diagnosis as of "Flor. Suec." Wahlenberg and Fries collected in Lapland a violet which was not *V. elatior*, but according to Fries a var. of *V. canina* and according to Becker, etc., their "*V. montana*," *i. e. V. Ruppii*. This plant was collected by Wahlenberg in fruit only, but was refound by Fries and published in Herb. norm. suec., fasc. x, no. 36. He published his views on the whole matter in Nov. Fl. Suec. pp. 273, 277–9 (1828). Under *V. elatior* he cites all the important synonyms belonging to *V. montana* L. and also "V. montana, *Linn. Spec.* 2, *p.* 1325, ex herb. & syn., speciatim Royen.! *Dec. Prodr.* 1, *p.* 299, α! β!—omniumque antiquior. speciatim Roth. Germ. 2, p. 270!! minim. ejus *V. persicaef*," but lower down adds "nomen vero ad *V. montanam* alteram Fl. Suec. pertinet." Of this latter (as *V. canina* γ *montana*) he says "V. montana *Linn. Suec. n.* 967 ex loco. *Wahl.! Lapp. n.* 399, *Suec. n.* 967."

Burnat and Briquet *op. cit.* state the case from a modern point of view. They consider that *V. montana* L. Sp. Pl. was an aggregate of *V. stricta*, *V. stagnina* and *V. elatior*, and that the name can therefore be used for any one of these three. They also consider that in the *Flora Suecica* Linnæus used the name for *V. stricta* Fr. alone, and remark "Linné . . . cite encore quelques synonyms douteux, mais il ne fait plus mention de Morison dont la figure se rapporte bien au *V. elatior* Fries." It has, however, been sufficiently pointed out how incorrect it is to call Linnæus's synonyms "douteux," and it remains to be shown that *V. montana* L. is an aggregate. Even if the original descriptions are somewhat vague, they were quite definitely and consistently understood by Ray, Parkinson, Plukenet, Tournefort, Morison, etc., and why not also Linnæus? If anyone nowadays records a find of "*Galium saxatile* Linn." or of "*Callitriche verna* Linn." it would be considered quite a definite statement, in spite of the fact that the original references have often been considered "douteux." But even if the premises were correct, this using of local floras to precise names "ex loco" is illogical. Obviously the author of a local flora is in a sense only dealing with those forms of the species which grow in his area, but he cannot in any sense be regarded as restricting the name to those forms. To take an example, Hudson (1762) Fl. Angl. p. 209 has (see Journ. Bot. 1907, p. 435) been regarded as restricting the name *Adonis annua* to the only British species, viz. *A. autumnalis*. This is not so. All that Hudson means is "The British Adonis belong to *A. annua* Linn., other varieties of which occur outside Britain." The name *A. annua* undoubtedly must, according to the international rules, be restricted to one species of *Adonis*, and this is done by Miller (*Gard. Dict.* 1768) who keeps up his two species as *A. annua* and *A. æstivalis*. But the plant must be cited as *A. annua* L. emend. Mill., and not *A. annua* L. emend. Huds., Miller being the first to use the name with the new connotation. Names in local floras, unless the contrary is definitely stated, are to be regarded as identifications, the author merely referring his plant to a known species. To regard them as restrictions is to fall into the "fallacy of the undistributed predicate," due to the neglect of the very first theorem of logic. Linnaeus identifies the Lapland *Viola* with *V. montana* Sp. Pl. (1753) and also of ed. 2 (1763), in which Morison is still quoted, the account of the species being unaltered. If his identification is incorrect *V. elatior* must be called "*V. montana* Linn. excluding all references to the Swedish plant." Borbas has rightly done this in Hallier's edition of Koch's Synopsis.

But in any case Fries only *assumed* that *V. elatior* did not grow in Lapland. The fact that he could not find it proves nothing. Fries remarks of *V. elatior*: "Fieri sane non potuit, ut *Ruppius & Hallerus* insuper optime seorsim tractans, hanc *ad Linnæanum seculum notissimam plantam*, pro '*nondum descripta*' habuerint." The specimen of *V. elatior* in Herb. Linn. was there in 1753 [*fide* B. D. Jackson], so that Linnæus himself knew this most distinct species. Why did he say that it grew in Lapland? He did not collect it there himself, as it is not mentioned in his *Flora Lapponica*, nor is Lapland mentioned by Bauhin, Morison, etc. But in the Banksian herbarium there is a specimen labelled by Banks "V. montana L. . . . . Alpes Lapponiæ Solander." Solander's home was in Lapland, which he left for Upsala, where he was Linnæus's favourite pupil (see Pulteney Sketches, ii, 350 (1790)). He left there in 1759 for London, and never went back to Sweden. He therefore presumably possessed the specimen when he was at Upsala, and Linnæus doubtless saw it. It is doubtless this plant that is referred to in *Spec. Plant.*, and it is even probable that the specimen in Linn. Herb. is part of the same gathering, as it bears none of the signs by which Linnæus usually distinguished specimens from the Upsala garden and from various collectors in Europe and elsewhere.

Thus it is clear that the whole case founded on Wahlenberg and Fries disappears, the correct references for the two species being

(1) *V. montana* Linn. *Sp. Pl.* p. 935 (1753); *Fl. suec.* p. 305, no. 967 (1755); et herb.!; omn. auct. ante. ann. 1824; Borbas in Koch *Synops. der Deutsch u. Schw. Fl.* edit. Hallier 213 (1890).

V. elatior Fries *Nov. Fl. suec.* 277 (1828).

(2) *V. Ruppii* Allioni *Fl. Ped.* ii, 99, iii, t. 26, f. 6 (1785), emend. [incl. *V. nemoralis* Kutz., etc.] Borbas *l. c.* 207 (1890).

V. montana (non L.) Becker *loc. cit.* 1902; Burnat et Briquet *loc. cit.* (1902).

The plant distributed by Fries (*Herb. norm. suec.* fasc. x 36 as *V. canina* v. *montana*) does not seem to be precisely *V. Ruppii*. The very large stipules suggest some admixture of *V. elatior*.

The forms of *V. Ruppii* require further study in the field, especially in the British locality. At Woodwalton it occurs with *Viola stagnina* Kit. sec. Rchb., and a considerable number of other forms, some certainly of hybrid origin, others perhaps more doubtfully so. On the peat cuttings outside the fen it forms low-growing tufts, very floriferous, with decumbent-ascending branches. This is the form described by Allioni and distributed by Reichenbach (Fl. germ. exsicc. 1770) as *Viola Ruppii* planta genuina, and Rostan (Exsicc. Pedemont. 189) as *Viola Rupii* (sic). On the fen droves a taller plant grows, varying in height according to the height of the herbage. This appears to be the plant described by Kutzing as *V. nemoralis*, and our plants agree with those distributed in Kerner's Flora exsicc. austro-hung. (2869 as *V. nemoralis*) from Galicia. It seems to us probable that difference in exposure is alone responsible for these two forms. The plant which has been named *V. canina* var. *crassifolia* Grönv. is apparently nothing but this *V. Ruppii* "conditio exposa."

Whether there may also be a third species in the fen is at present doubtful. *V. canina* L. emend. Rchb. is essentially a plant of dry sandy soils unlikely to be present, and the var. *lucorum* may perhaps be really a form of *V. Ruppii*. *V. Schultzii*, *V. stricta* and other forms to which names have been given appear to be matched by plants collected in the fen, but their true nature, whether hybrids or varieties, has yet to be determined. They grow on the continent in a similar manner with *V. stagnina* and *V. Ruppii*, and considering the fact that all sorts of intermediates in respect of any character can be found in the fen, it is difficult to say where the limits of *V. Ruppii* and its varieties and conditions can be drawn as distinct from the hybrid forms.

Since it is difficult to fix the limits of *V. Ruppii* it is not easy to say exactly how it differs from *V. canina*, but *V. Ruppii* is to be distinguished especially by its habitat; peaty fens as opposed to dry sandy soils. It is erect when well grown, though decumbent when dwarf. The stipules are green and leafy, larger than those of *V. canina*, about $\frac{1}{3}$–$\frac{1}{2}$ the length of the petioles in the upper middle leaves, and sometimes equalling them in the upmost leaves. They vary much in size, perhaps owing to crossing with *V. stagnina*. The petioles are longish, equalling to exceeding the laminæ when fully grown, and winged above. The laminæ are cordate-ovate and blunt, varying from fleshy in the dwarf plants to very thin in the plants much drawn up in rank grass. They are sometimes elongated, again perhaps owing to crossing with *V. stagnina*. The flowers are borne on long peduncles and are large and broad as in *V. Riviniana*, but are pale bright blue in colour. The spur is rather slender, greenish, two or three times as long as the calyx appendages. The capsule is acute.

It was also gathered in Cambridgeshire in the fens around Chatteris by Fryer, and should be looked for in suitable localities elsewhere, where it may have been passed over as *V. canina*.

COUNTY LISTS OF MOSSES.

By C. P. Hurst.

In recording the following mosses, the nomenclature and arrangement of the *Census Catalogue of British Mosses* (1907) have been followed, and of course the old county boundaries have been adhered to. The number or numbers appended to some of the mosses indicate the vice-county or vice-counties in which they have been observed. I am greatly indebted for notes and assistance to Messrs. H. N. Dixon, H. H. Knight and J. A. Wheldon, and also to the Marlborough College Natural History Society and Mr. Dixon for kind permission to make a long extract from the latter's very interesting article, "The Moss Flora of the Marlborough Greywethers," published in the *Report of the Marlborough College Natural History Society* for 1907, pp. 28–30, and reprinted in *The Wiltshire Archæological and Natural History*

Magazine, xxxv, pp. 587–590 (December, 1908). The following catalogue contains about forty new records, including a Cornish variety new to Britain, and I hope will be of use to future compilers of county moss floras. c.fr. = With fruit. * = New vice-county record.

Berkshire Mosses (c. 22).

The list below includes mosses that were observed growing near Hungerford and Newbury; my thanks are due to Messrs. A. B. Jackson (J.) and F. Comyns (C.) for localities in the vicinity of the latter town. The discovery of the isolated *Grimmia trichophylla*, *G. decipiens*, *G. leucophæa*, *Hedwigia ciliata* and *Orthotrichum rupestre*, very much strangers in a strange land, on the sarsen stones at Ashdown Park, near Lambourn, is noteworthy; here the moss flora seems to be a replica of that of the Marlborough Greywethers in Wiltshire, which lie about twelve miles to the south-west. The above mosses and *Polytrichum juniperinum*, *Dicranoweisia cirrata*, *Dicranum scoparium*, *Grimmia apocarpa*, *G. pulvinata*, *Bryum capillare*, *Hypnum cupressiforme*, etc., grow at Ashdown Park in very much the same proportions and condition as they occur on the Marlborough Sarsens. I have not noticed *Grimmia subsquarrosa*, *Rhacomitrium heterostichum* var. *alopecurum*, *Ulota Hutchinsiæ* and *Pterogonium gracile*, which are found near Marlborough, but these mosses may be discovered. Mr. Dixon's remarks in the preface to "The Moss Flora" above mentioned are very apposite here and I quote them freely: "These boulders, composed of almost pure siliceous sandstone, lying high and dry on the slopes and bottoms of the chalk downs, would hardly be expected to furnish a rich moss-flora, and indeed a sarsen stone might be pardoned if it afforded the bryologist no better sport than its proverbial *rolling* namesake. In very few instances, indeed, can the mosses be said to flourish, and this only in the case of rigidly saxicolous species. What constitutes the interest of this flora is its specialised character, which corresponds in a remarkable way with the isolated nature of the boulders on which it occurs. Six at least of the species observed, it may be confidently asserted, would not occur elsewhere in the county except on these stones, and this may very likely apply to several others. *Grimmia decipiens*, for example, occurs in Cornwall and North and South Devon, but nowhere else nearer than West Sussex on the east and Herefordshire on the north. *Grimmia leucophæa* has an almost similar distribution, but is still more rare, and occurs only in South, not in North Devon; while that of *G. trichophylla* and *Hedwigia ciliata* is almost precisely analogous. *Orthotrichum rupestre*, again, is only known, I believe, in the South of England from single stations in South Devon, South Wilts (probably equally on sarsen stones), and East Sussex. These and most of the other rupestral species noted are almost exclusively silica-loving or calcifuge in their distribution. . . . The above species then must be considered somewhat as intruders into the flora of the district, where they exist as it were on sufferance. . . . How and whence they arrived it is not quite easy to say. It is extremely unlikely that any one of them represents the original flora of the time when the beds were exposed from which the stones themselves were derived. In all probability the spores were in most cases carried by westerly winds from the granite rocks of the Cornish peninsula, in comparatively recent times. For the greater number of the mosses observed, however, which are frequent and widely distributed species, there is no need to seek such an explanation." Mr. Jackson's record of the rare *Ephemerum recurvifolium* in two places at Weston, near Welford, is interesting, and *Philonotis cæspitosa* flowering in a bog near Bagshot, Hungerford, is a noticeable addition to the county, while *Seligeria paucifolia* in the hanging wood on the chalk escarpment called Rivar Copse, near Inkpen, Hungerford, *Leptodontium flexifolium* and *Splachnum ampullaceum* on Greenham Common, Newbury, and the fruiting *Hypnum cordifolium* growing in the marsh near Bagshot with *Philonotis cæspitosa* are also outstanding species.

Sphagnum intermedium Hoffm. Greenham Common (*J.*).

Tetraphis pellucida Hedw. Near Boxford, Newbury (*Miss Stansfield*); Brimpton (*J. & C.*).

Catharinea undulata var. *minor* Web. & Mohr. Finchampstead Woods (*J.*).

Polytrichum nanum Neck. Plentifully in a fallow field near Burridge Heath, Great Bedwyn, fruiting freely in several places.—*P. juniperinum* Willd. Very rare on the sarsen stones at Ashdown Park, Lambourn.—*P. commune* L. Snelsmore Common, Newbury; abundant on commons near Newbury (*J.*).

Seligeria paucifolia Carruth. On a small lump of chalk in the hanging wood called Rivar Copse, near Inkpen, Newbury; Mr. H. H. Knight found this species on White Horse Hill, Uffington, where it had previously been observed by the Rev. W. O. Wait, as recorded by Mr. G. C. Druce in the *Victoria County History of Berkshire*. It seems to be the only *Seligeria* that has been found in the county.—*S. calcarea* (B. & S.) is recorded for the bordering counties of Hampshire, Bucks and Surrey, and should be looked for in the Berkshire chalk pits.

Archidium alternifolium Schp. By Queen's Mere, Finchampstead, near Wokingham (*Miss E. Armitage*).

Dicranoweisia cirrata Lindb. This common moss occurs plentifully and fruits on the sarsen stones at Ashdown House, Lambourn.

Campylopus pyriformis Brid. Greenham and Snelsmore Commons, Newbury (*J. & C.*); also on tree stumps near Shalbourne, Hungerford.

Dicranum scoparium Hedw. Not common on the sarsen stones at Ashdown Park.

Leucobryum glaucum Hampe. Greenham and Snelsmore Commons (*J. & C.*); Finchampstead (*Miss Armitage*).

Fissidens adiantoides Hedw. Compton Downs, Newbury (*J. & C.*).

Grimmia apocarpa Hedw. Rare on the sarsen stones at Ashdown Park.—*G. pulvinata* Smith, *G. trichophylla* Grev.* and *G. decipiens* Lindb.* Common and fruiting freely on sarsen stones at Ashdown Park.—*G. leucophaea* Grev.* Growing freely on one sarsen stone at Ashdown Park.

Rhacomitrium canescens Brid. Greenham Common (*J.* & *C.*).

Hedwigia ciliata Ehrh.* Growing plentifully on the sarsen stones at Ashdown Park (*J. & C.*); I saw one capsule.

Acaulon muticum C. M. Near Enborne, Newbury (*J.*).

Tortula mutica Lind. Tree roots near Enborne (*J.*).

Barbula tophacea Mitt. Growing by the side of the Kennet and Avon Canal, near Newbury (*J. & C.*).—*B. sinuosa* Braithw. On the roots of trees near Rivar, Shalbourne.

Leptodontium flexifolium Hampe. Peaty ground on Greenham Common (*W. R. Sherrin & J.*).

Weisia viridula var. *amblyodon* B. & S.* Sandy bank near Bagshot, Hungerford (*teste Dixon*).

Orthotrichum rupestre Scleich.* Rather plentiful on the sarsen stones at Ashdown House, fruiting freely.—*O. leiocarpum* B. & S. Tree trunk by the Kennet and Avon Canal towards Hampstead Marshall (*J.*).

Splachnum ampullaceum L. Messrs. Bowman and Jackson independently found this interesting moss growing upon bovine excrement on Greenham Common.

Ephemerum serratum Hampe. Field near Weston; railway embankment near Reading (*J.*).—*E. recurvifolium* Lindb. Cornfield near Weston; cultivated field near Weston (*J.*).

Physcomitrium pyriforme Brid. Abundantly on the clayey side of a road near Inkpen, Newbury; marsh near Bagshot, Hungerford.

Funaria fascicularis Schp. Abundantly in a fallow field near Oxenwood, Hungerford; also in Mr. J. H. Bowman's garden at Greenham Common (*J.*).

Aulacomnion palustre Schwaeg. Greenham Common (*J. & C.*); marshy ground near Bagshot, sparingly.

A. androgynum Schwaeg. Bucklebury and Greenham Commons (*J. & C.*), sometimes abundant on the latter common but uncertain in its occurrence.

Bartramia pomiformis Hedw. Near Redhill, Enborne (*J. & C.*); abundantly and fruiting freely on a sandy bank near Enborne Church.

Philonotis fontana Brid. Wickham Clay Pits (*J. & C.*); plentifully in a clayey place near Burridge Heath, Great Bedwyn.—*P. cæspitosa* Wils.* Flowering in a rushy marsh near Bagshot, Hungerford, where it grows with *Hypnum cordifolium* c.fr., and *Physcomitrium pyriforme* c.fr.; this is the third bog in the Great Bedwyn district in which I have found this moss; the bogs are situated on a large Eocene outlier.—*P. calcarea* Schp. By the side of the Kennet and Avon Canal, near Newbury (*J. & C.*).

Webera annotina Schwaeg. Greenham Common (*J. & C.*).

Bryum capillare L. Plentifully on the sarsen stones at Ashdown Park, not very common in fruit.—*B. roseum* Schreb.* Snelsmore Common (*J. & C.*); plentiful in Rivar Copse, Inkpen.

Mnium punctatum L. On the sandy sides of a deeply sunken rivulet near Burridge Heath, Great Bedwyn, c.fr.

Cryphæa heteromalla Mohr. Welford Woods, near Newbury (*J. & C.*); on elder.

Leucodon sciuroides Schwaeg. On sarsen stones at Ashdown Park, not common.

Porotrichum alopecurum Mitt. Fruiting rather freely in Rivar Copse, Inkpen; also by the side of a shady walk, near Rivar, c.fr.

Leskea polycarpa Ehrh. Trunks of trees by water near Enborne; Wash Common (*J.*).

Climacium dendroides Webb & Mohr. Greenham Common (*J. & C.*); in a marshy place near Burridge Heath, Great Bedwyn; reed bed near Kintbury.

Brachythecium salebrosum B. & S. c.fr. Willow stumps in osier bed between Midgham and Aldermaston (*J. & C.*).—*B. illecebrum* De Not. On the ground in Hampstead Marshall Park, Newbury (*J. & C.*); also near Greenham Church, Newbury (*J. & C.*).

Eurynchium crassinervium B. & S. On a hedgebank by the roadside near Oxenwood, Hungerford.—*E. abbreviatum* Schp. Near Crookham, Berks (*J. & C.*).—*E. pumilum* Schp. Bank in lane near Crookham (*J. & C.*)—*E. striatum* B. & S. Abundant but very rare in fruit; c.fr. Rivar Copse, Inkpen; in Cornwall, around Looe and Polperro, the fruit is common, and Mr. Rilstone tells me he finds fertile plants more frequently than sterile ones, the fruiting specimens being brighter and handsomer than those without capsules.

Amblystegium Juratzkanum Schp. On wood at Mapledene, Enborne Road, Newbury (*J.*).

Hypnum aduncum Hedw. non L. Snelsmore Common, Newbury.—*H. fluitans* var. *Jeanbernati* Ren. Swinley Park, Berkshire (*J.*).—*H. cupressiforme* L. Abundant on sarsen stones near Ashdown Park, where it appears to be the dominant species.—*H. cupressiforme* var. *resupinatum* Schp. Rather scarce on sarsen stones near Ashdown Park; an addition to the sarsen stone moss flora, but "one of those forms that show the relationship to type so clearly that the question of specific value is, I think, quite precluded" (*Dixon*).—*H cordifolium* Hedw. C.fr. in a bog near Bagshot, Hungerford, growing with *Philonotis cæspitosa* Wils.; abundantly in a reed bed near Kintbury.

Thuidium Philiberti Limpr., and *Hylocomium loreum* B. & S. grow in North Wiltshire, but are unrecorded for Berkshire, where it is likely that they will be found; the former should be looked for among short grass in chalk pits and on downs, and the latter should be searched for in woods.

WILTSHIRE MOSSES.

The following mosses were gathered round Great Bedwyn, a village which lies about seven miles to the south-east of Marlborough, near the middle of the eastern border of Wiltshire; they are additional to those that appeared in my paper on East Wiltshire Mosses in the *Journal of Botany* for January, 1916. The Kennet and Avon Canal passing through Great Bedwyn divides Wiltshire into the vice-counties of North Wiltshire (v.c. 7) and South Wiltshire (v.c. 8).

An interesting new vice-county record is *Eurynchium megapolitanum* which fruits at the base of a wall in the village of Mildenhall, near Marlborough (v.c. 7); it has been found in the neighbouring county of Berkshire but is a rare moss, generally growing on stony and sandy seashores. The list contains nineteen Wiltshire new county records. **7** = North Wiltshire. **8** = South Wiltshire.

Sphagnum subsecundum Nees. **7.*** Wet place near the Column, Savernake Forest (*teste Knight*).

Polytrichum nanum Neck. **7.*** On a sandy bank near a small pool where the deer drink in Tottenham Park, Savernake Forest.—*P. juniperinum* Willd. **7.** Very plentiful in a place in Tottenham Park, near the Mansion; near Puthall Gate, Savernake Forest; not a common moss in this calcareous district.—*P. commune* L. **7.*** In several damp places near the Column, Savernake Forest; this fills a gap in a long series of vice-county records.

Districhum flexicaule Hampe. **7.** On the sides of the Oare Hill road cutting, near Marlborough; not uncommon on the downs.

Campylopus pyriformis Brid. **7.** C.fr. near the Rhododendron Drive, Savernake Forest.

Dicranum Bonjeani De Not. **8.** In two localities among heather at Bedwyn Brails Wood, Great Bedwyn, growing plentifully.

Fissidens viridulus Wahl. **7.*** On a hedgebank near Mildenhall, Marlborough.—*F. incurvus* Starke. **8.*** On clayey ground among grass with *Philonotis fontana* at Bedwyn Brails Wood. Mr. H. H. Knight, of Cheltenham, sends me the following interesting note: "The small *Fissidens* are puzzling and I think the habitat is a help. *F. exilis* and *incurvus* like clay. *F. viridulus* grows in various places, here (Cheltenham) often on grassy banks, hedgebanks, etc. With us, it is not a rock plant. *F. pusillus* is purely a rock plant and is plentiful on oolitic stones in woods on the Cotswolds. The four above-mentioned species are all more abundant (near Cheltenham) than the universally distributed *F. bryoides*."—*F. adiantoides* Hedw. **8.** On chalk downs near Burbage, Savernake, c.fr.

Pottia lanceolata C. M. **8.** Chalk downs near Burbage.

Tortula mutica Linds. **7.*** At the base of a beech in a copse near Oare Hill, Marlborough; with it grew *Cryphæa heteromalla*, which generally prefers higher situations on the tree trunks.—*T. papillosa* Wils. **7.*** On a small tree by the roadside near Mildenhall.

Barbula sinuosa Braithw. **7.** On the roots of beeches in a copse near Oare Hill; this moss, which has never been found in fruit, generally grows on stones and walls.—*B. unguiculata* var. *cuspidatum*. **8.*** On chalk near Bedwyn Brails Wood (*teste Dixon*).

Weisia crispa Mitt. **7.*** Growing with *Fissidens viridulus* on a hedgebank near Mildenhall.—*W. viridula* Hedw. **7, 8.** Very rare round Great Bedwyn as it is generally in calcareous districts; near Knowle Farm, Great Bedwyn; on a bank of Upper Greensand on the county boundary at Shalbourne, Hungerford.

Philonotis fontana Brid. **8.** This year I noticed male flowers in three places in the marshy depression near Shalbourne Newtown, where this moss occurs luxuriantly; here it grows with the delicate flowering *P. cæspitosa* which soon withers up under the sun's rays, the more robust *P. fontana* lasting much longer.—*P. calcarea* var. *laxa* Dismier. I recently saw this plant by the side of the Kennet and Avon Canal near Wootton Rivers, about six miles along the Canal from Great Bedwyn: this is an extension of its range westwards.

Webera nutans Hedw. **8.*** Bedwyn Brails Wood, growing freely in one place near a tree stump; Mr. H. H. Knight in "The Mosses of Gloucestershire" (*v.* Proc. Cotteswold Nat. F.C., vol. xviii, pt. 3, 1914, pp. 257-291) says that this moss is "rare on the Cotswolds where it is usually confined to tree stumps in woods"; it dislikes calcareous soil.

Bryum inclinatum Bland. **8.** On London Clay at Dod's Down Brickworks, Great Bedwyn (*teste Knight*).—*B. atropurpureum* Web. & Mohr. **7.*** On bare clayey ground in Tottenham Park, plentifully; near it *Pleuridium subulatum* is very abundant. —*B. roseum* Schreb. **8.*** Growing on ant-hills on chalk downs near Burbage, Savernake Forest; this sylvan moss also grows in the open near Cheltenham and occurs on sandhills near Harlech in Merionethshire, the latter locality is one of the few places where the capsules are produced.

Cryphæa heteromalla Mohr. **7, 8.** Further search has shown that this moss is not uncommon in the Savernake Forest district, I have found it in a good many localities, in some places quite plentifully.

Climacium dendroides Webb & Mohr. **8.** Marshy place near Woodborough.

Brachythecium albicans B. & S. **7, 8.** Fine and fruiting copiously on a thatched roof near Savernake Station; this is the fourth thatched roof in this district on which I have found this moss with capsules.

Eurynchium tenellum Milde. **8.** Growing plentifully and fruiting freely inside a brick shaft at the Dod's Down Brickworks. —*E. murale* Milde. **7.** On a wall near Savernake Station; at Oare Hill, near Marlborough, plentifully on the chalk escarpment upon earth and the roots of beeches, an unusual habitat for this rupestral species.—*E. megapolitanum* Milde. **7.*** C.fr. at the base of a wall in the village of Mildenhall.

Amblystegium Kochii B. & S. **8.*** Very wet place near Shalbourne (*teste Cardot*).

Hypnum riparium L. **7.*** On a tree stump by the side of a pond near Martinsell Hill, Marlborough, in fine fruit.—*H. aduncum* group *Kneiffii* var. *polycarpon* Bland. **8.*** In a very wet place, semi-submerged, near Shalbourne, Hungerford. Mr. J. A. Wheldon kindly sent me the following very interesting note regarding this moss: "I think your plant comes without any doubt under var. *polycarpon* Bland, rather than under v. *intermedium.* The cells are short and often in the lower part *very* short and parenchymatous, and the outline of the leaf is quite that of v. *polycarpon.* In addition it shows the curious mortification of the stem apices from which issue slender surculi which often occurs in this var. and are said to exist in Blandow's original example. Renauld refers to frequent occurrence of this malformation or 'sport' in this var. in *Mosses of France* (Boulay), The var. *intermedium* is usually more robust and with longer cells, the long cells continuing down nearer to the base, and the forma *laxifolium* shows this character and differs only in its distant leaves. It is sometimes nearly as robust as forms of group *pseudofluitans* whereas v. *polycarpon* is rarely a fine tall plant and always somewhat slender. In Lancashire the var. *intermedium* is a much commoner plant than is var. *polycarpon*—and I think that is the case throughout England."—*H. aduncum* group *pseudofluitans* var. *paternum* forma *gracilis* Ren. **8.*** Growing in dense masses in a pool on London Clay at Dod's Down Brickworks (*teste Wheldon*).—*H. exannulatum* var. *pinnatum* Boul. **8.** Growing by the side of the above pool on London Clay at Dod's Down Brickworks (*teste Wheldon*); this is the typical form of *H. exannulatum* Gümb.—*H. cupressiforme* var. *ericetorum* B. & S. **7,* 8.*** C.fr. among heather near London Ride, Savernake Forest; also c.fr. among heather near Bedwyn Brails Wood, scarcely so pinnate as typical *ericetorum* but would distinctly come under this var. (*teste Knight*).—*H. cordifolium* Hedw. **8.** C.fr. in a very wet rushy place in Bedwyn Brails Wood; I recorded this moss in my paper on East Wiltshire Mosses above mentioned, and was pleased to find that at the end of May capsules were produced freely; the setæ are very long in this species.

Hylocomium splendens B. & S. **8.** C.fr. among heather near Bedwyn Brails Wood, a new locality for the fruit.

Dorset Mosses (c. 9).

The following mosses were collected in the neighbourhood of Swanage, Dorset, in February, 1916. Perhaps the most interesting species in the short list is the rare *Campylopus subulatus* which occurs in various places on the maritime sands of Studland Bay near Swanage and is a new county record for Dorset. It was found by Mr. H. N. Dixon in the New Forest in South Hampshire (v.c. 11) some years ago and also grows in South Somerset (v.c. 5); according to the Census Catalogue to gather it elsewhere in England one would have to go as far north as v.c. 69 (Westmorland with North Lancashire) though it has been found in several of the Welsh counties and occurs in five of the Scottish ones. Mr. C. B. Green's discovery of *Bryum capillare* var. *torquescens* on Hambledon Hill, near Blandford, is also noteworthy.

Polytrichum juniperinum Willd. Abundant and fruiting copiously on the sandhills at Studland Bay, Swanage.

Campylopus subulatus Schp.* Growing very plentifully in several places among the heather on the sandhills at Studland Bay.—*C. fragilis* B. & S. On the sandhills at Studland Bay.

Tortula ambigua Angstr. On walls at New Swanage.—*T. ruraliformis* Dixon. On sand at Studland Bay.

Barbula rubella Mitt. Very fine on a sandy bank near Studland.—*B. convoluta* var. *Sardoa* B. & S.* Plentiful on a sandy bank near Studland, in large, conspicuous, bright yellowish-green cushions.

Weisia crispa Mitt. Fine, fruiting copiously and plentiful on the cliffs to the west of Swanage, luxuriating in the highly calcareous soil.

Trichostomum nitidum Schp. Abundant round Corfe Castle (*Dixon*); on oolitic rocks on the coast to the west of Swanage.

Aulacomnion palustre Schwaeg. Corfe Common (*Green*).

Bryum capillare var. *torquescens* Hus.* Hambledon Hill, near Blandford (*Green—teste Dixon*).

Cryphæa heteromalla Mohr, and *Leptodon Smithii* Mohr. On trees at Studland.

Eurynchium tenellum Milde. C.fr. on rocks on the coast to the west of Swanage.

CORNISH MOSSES.

The mosses below occurred mainly in the vicinity of Looe and Polperro in East Cornwall; I have also included some records from West Cornwall. *Tortula atrovirens* var. *edentula* growing near Looe is a variety new to the British Islands, and other interesting species are *Pottia Wilsoni* found plentifully in one place on the coast to the east of Looe and merging into the *P. asperula* with which it grows, *P. Starkeana* on clay cliffs at Portnadler, Looe, *Tortula lævipila* var. *lævipilæformis* discovered in three Cornish localities and lacking the foliose gemmæ though placed under this var. by Mr. Dixon, *U. phyllantha* growing with *Grimmia maritima* on rocks by the sea at Polperro and on trees at Trelawne near Looe, *Webera Tozeri* occurring sparingly with *W. carnea* at Polperro, the wet place form of *Eurynchium Swartzii* observed in watery places around Looe and Polperro, and *E. circinatum* growing on rock near Looe Station and pointing to the presence of lime in the Lower Devonian strata. I am very much obliged to Mr. F. Rilstone (R.), of Polperro, for many stations including seven new vice-county records. West Cornwall is separated from East Cornwall by a line traced along the high road from Truro, through St. Columb to the inland extremity of Padstow Creek, the salt water at the two ends of this line completing the division. (1 = West Cornwall. 2 = East Cornwall.)

Polytrichum aloides Hedw. 2. Very frequent near Polperro (*R.*).

Ditrichum flexicaule Hampe. 1. Abundantly at Perranporth (*R.*).

Dicranoweisia cirrata Lindb. 2. Growing plentifully on boulders with *Hedwigia ciliata* at Binn Down near Looe, in a manner very reminiscent of the Marlborough Greywethers.

Campylopus pyriformis Brid. 2. Fruits freely in Trelawne Woods, Looe (*R.*).—*C. fragilis* B. & S. 1, 2. Plentiful at Perranporth; sparingly near Polperro (*R.*); sparingly in a hedgebank near Binn Down, Looe.

Fissidens viridulus Wahl. 2. Hedgebank near Looe.—*F. Curnowii* Mitt. 1. Mouth of old mine adit, St. Agnes (*R.*).

Grimmia apocarpa var. *gracilis* Web. & Mohr. 2. On a boulder on the coast east of Looe (*teste Dixon*).—*G. maritima* Turn. 2. Very freely on sea rocks at Polperro (*R.*); very fine, abundant and fruiting freely on the coast to the west of Looe.—*G. trichophylla* Grev. 1, 2. Abundant on rocks on a hillside at Polperro (*R.*); in various places round Looe, c.fr. on a rock between Looe and Talland.

Rhacomitrium fasciculare Brid. 2. At Trelawne and elsewhere near Polperro (*R.*); c.fr. on stones in the garden of Lemain, West Looe.—*R. lanuginosum* Brid. 2. Sent me by Dr. A. Adams from the vicinity of Looe; I also observed this moss growing on a stone wall near the Hessenford Valley, Looe.

Ptychomitrium polyphyllum Fürn. 2. Uncommon near Polperro (*R.*); on a stone wall near the Hessenford Valley, Looe.

Hedwigia ciliata Ehrh. 2. On boulders on Binn Down, Looe, and c.fr. on rocks between Looe and Talland.

Pottia Wilsoni B. & S. 2. Growing plentifully in one place near Windsworth on the coast to the east of Looe and running into *P. asperula* with which it grows. Mr. Dixon wrote, "Your *Pottia* is *P. Wilsoni* in very good condition," and after receiving a fresh gathering, "The *Pottia* must be considered I think the same as before—*P. Wilsoni*. In the former gathering I noticed many capsules short and truncate as here, tending to suggest *P. asperula*; but the leaves were octofarious. Here the '*asperula*' form of capsule is in greater preponderance, but the leaves still seem octofarious, and I think it must go as *P. Wilsoni*, emphasizing what I have said as to the unsatisfactoriness of *P. asperula* as a species," and afterwards he wrote about the latter gathering, "I think that some bits of the *Pottia* about which I wrote yesterday might be called *P. asperula*, having leaves less rosulate and less octofarious and the short truncate capsules almost to the exclusion of the longer ones. But evidently the two plants run into one another."—*P. asperula* Mitt. 2. Growing sparingly with *P. Wilsoni* as above.—*P. Starkeana* C. M. 1, 2. Perranporth (*R.*); on clay sea cliffs at Portnadler, near Looe, Mr. Dixon wrote about the Portnadler plant, "Some of it is certainly very small but other plants here and there are much larger and more normal."

Tortula aloides De Not. 2. Abundant on clay sea cliffs at Portnadler and occurring elsewhere near Looe.—*T. atrovirens* Lindb. 2. Growing with and running into the following:—*T. atrovirens* var. *edentula* (B. & S.) Par. (1906). Syn. *Desmatodon nervosus* var. *edentulus* B. & S. (1843). **2.*** This variety, new to the British Islands, grows and intergrades with the type; its characteristic is the imperfectly developed peristome which is sometimes reduced to a mere rim. I first found this plant at the end of 1914 on a low cliff of "head" or gravel near Hannafore Point, West Looe; this station was afterwards destroyed by the crumbling of the cliff. I afterwards saw it in minute quantity in several places on the coast in Hannafore, West Looe; and then I found it growing for some yards on a roadside bank near Talland, about two miles to the west of Looe, where the small red rim to which the peristome is sometimes reduced was very noticeable. In 1916 I observed it growing fairly plentifully in one place on the clay sea cliffs at Portnadler, to the west of Looe; of plants from the last locality, Mr. Dixon wrote, "The *Tortula atrovirens* is most of it very well marked var. *edentula*." It was first described from the Cape of Good Hope, and then was found in Spain, and Normandy and Brittany. Mr. Dixon also recorded it from Teneriffe (Journ. Bot. 1911, p. 3) as follows (in a list of mosses collected by Dr. Salter): "Old lava flow, Guimar. This is probably the var. *edentula* (B. & S.) Par., having the peristome teeth very short and fragmentary, and arising from a somewhat broad, papillose basal membrane. The degree of development of the teeth varies, however, a good deal, and the variety would seem to be of dubious value."—*T. cuneifolia* Roth. **2.** Fruiting on rock at two places on the coast to the east of Looe, viz. near Millendraeth Beach and near Windsworth.—*T. lævipila* var. *lævipilæformis*. **1,* 2.*** Trees at Lambriggan, near Perranporth (v.c. 1), Idless, near Truro (v.c. 1), and Talland, Polperro (v.c. 2), all the plants were assigned to this var. by Mr. Dixon, though they lacked the foliose gemmae (*R.*).—*T. ruralis* Ehrhr. **2.** Of restricted occurrence near Polperro (*R.*).—*T. ruraliformis* Dixon. **1.** Perran Sandhills (*R.*).

Barbula tophacea Mitt. **2.** On a calcareous rock face (possibly old mortar) in Polperro valley (*R.*); on rock near Hannafore Point, West Looe, also c.fr. on rock on the coast close to East Looe; *Barbula tophacea*, *B. cylindrica*, *Orthotrichum anomalum* var. *saxatile*, *Eurynchium tenellum*, and *E. circinatum* growing in the town of Looe, indicate the presence of lime in the Lower Devonian Rocks.—*B. cylindrica* Schp. **2.** Very fine and abundant on the rock face in West Looe near the Bridge. *B. Hornschuchiana* Schultz. **2.*** In fair plenty on the ground near and east of the Lawn Tennis Courts, Hannafore Point, West Looe.—*B. convoluta* var. *Sardoa* B. & S. **2.** Fine and very common on rock between Hannafore Point and the Bridge.

Weisia viridula Hedw. **2.** Abundant on the Looe Cliffs.—*W. mucronata* B. & S. **1.*** Downs above the cliff at St. Agnes (*R.*).—*W. verticillata* Brid. **1.** Cliff at Perranporth (*R.*). Mr. Rilstone sends the following interesting note: "A noteworthy feature of the moss flora of the Perranporth area is the calcareous type of the sandhill plants (the sand is 50 per cent. carbonate of lime). Plants which grow abundantly there (and are scarce and absent beyond), are *Camptothecium lutescens*, *Tortula ruraliformis*, *Eurynchium circinatum*, and *Ditrichum flexicaule*, while *Weisia verticillata* flourishes on calcareous matter on a portion of the cliff."

Trichostomum mutabile Bruch. 2. Common and very fine round Looe.—*T. mutabile* var. *littorale* Dixon. 2. Growing with *Tortula cuneifolia* on a rocky bank to the east of Looe, also elsewhere near Looe.

Pleurochæte squarrosa Lindb. 2. On the coast immediately to the east of Polperro, rather sparingly; plentifully among grass and extending for a short distance, on the coast near Millendraeth Beach, to the east of Looe.

Zygodon Mougeotii B. & S. 1.* Wall below St. Agnes' Church; Trevellas Valley (on rock face); Ventongimps, nr. Perranporth (*R.*).—*Z. viridissimus* R. Brown. 2. "Fruits, I think, fairly well in Cornwall. I have found capsules in half-a-dozen localities" (*R.*); c.fr. in several places round Looe.

Ulota phyllantha Brid. 2. Sparingly on rocks by the sea at Polperro with *Grimmia maritima*, also on trees at Trelawne near Looe (*R.*).

Orthotrichum anomalum var. *saxatile* Milde. 2. On rock near Looe Station.—*O. Lyellii* Hook. & Tayl. Up to the present Mr. Rilstone has not seen this moss in Cornwall, nor did I observe it near Looe. Mr. Rilstone writes: "Species of *Orthotrichum* are not particularly common in Cornwall, in fact until two years ago I had only found *O. diaphanum*, and that by no means plentifully." Possibly the sparsely wooded nature of the county has something to do with this.

Physcomitrium pyriforme Brid. 2. Fairly frequent near Polperro (*R.*)

Bartramia pomiformis Hedw. 2. C.fr. by a rocky roadside near Morval, Looe.

Philonotis fontana Brid. 2. Frequent near Polperro (*R.*)

Breutelia arcuata Schp. 1.* Moors near Perranporth (*R.*).

Leptobryum pyriforme Wils. 2. Greenhouse at Polperro (*R.*).

Webera nutans Hedw. 1. Abundant in some parts of West Cornwall (*R.*).—*W. proligera* Bryhn. 1. Frequent in West Cornwall (*R.*)—*W. carnea* Schp. 2. Plentiful near Polperro (*R.*).—*W. Tozeri* Schp. 2. Growing sparingly with *W. carnea* (*R.*).

Bryum atropurpureum var. *gracilentum* Tayl. 1.* Mud walls at Lambourne, near Perranporth (*R.*); plants of *Bryum atropurpureum* crowded with gemmæ on clay sea cliffs at Portnadler, Looe and on the coast immediately to the east of Looe (v.c. 2) not improbably come under this variety.—*B. murale* Wils. 2. Rather plentifully on walls at Hannafore Point, West Looe.

Cryphæa heteromalla Mohr. 2. Sparingly near Polperro (*R.*).

Neckera pumila Hedw. 2. C.fr. near Polperro (*R.*).—*N. pumila* var. *Philippeana* Milde. 2. Mr. Rilstone has found this var. near Polperro and thinks it may be not infrequent in the district.—*N. complanata* Hübn. 2. C.fr. near Polperro (*R.*); also c.fr. near Looe.

Pterygophyllum lucens Brid. 2. Fairly frequent near Polperro

(*R.*); c.fr. and in great luxuriance and beauty in a sheltered valley near Looe.

Pterogonium gracile Swartz. 2. Fairly frequent near Polperro (*R.*); in various places on rocks round Looe, not uncommon.

Anomodon viticulosus Hook. & Tayl. 2. Fairly frequent near Polperro (*R.*); in one locality to the west of Looe, also by the roadside near Polbalthick.

Leptodon Smithii Mohr. 2. On tree near Polperro, rare in Cornwall (*R.*).

Thuidium tamariscinum B. & S. 2. C.fr. near Polperro (*R.*); I found three capsules in a hedge near Trelawne, Looe.

Camptothecium lutescens B. & S. 1. Abundantly on sandhills at Perranporth (*R.*).

Eurynchium Swartziiforma. 2. A form "approaching on the one hand, *E. abbreviatum* (in the striate leaves and frequently narrow cells), and on the other var. *rigidum*; it cannot be referred to the latter, I think, on account of the habit and texture, the striate leaves, etc." I found this plant growing in the splash of a tiny cascade on the coast to the east of Looe and afterwards saw it pendent from the dripping roof of a wayside well near West Looe. Mr. Rilstone tells me that near Polperro mosses of *Eurynchium Swartzii* "are often plants of wet spots and have greatly puzzled me, seeming to suggest *E. speciosum*."—*E. tenellum* Milde. 2. Common and fruiting very freely on rocks around Looe.—*E. circinatum* B. & S. 1, 2. Rather plentiful on shell sand near Perranporth, West Cornwall (*R.*); on rock near Looe station, also on rock face by the pathside near Plaidy Beach, to the east of Looe.—*E. striatum* B. & S. 2. More frequently c.fr. than barren, near Polperro (*R.*).

Amblystegium irriguum B. & S. 2. On stones in streams near Polperro (*R.*).—*A. fluviatile* B. & S. 2. On stones in streams near Polperro (*R.*).

Hypnum aduncum var. *aquaticum* Sanio. 1.* On sand and stones in stream at Holywell, near Newquay (*R.*).—*H. exannulatum* Gümb.—2. Marshes near Polperro (*R.*).—*H. revolvens* Swartz. 2. Marshes near Polperro (*R.*).—*H. sarmentosum* Wahl. 1.* Moors near St. Agnes (*R.*); this record removes the bracket from v.c. 1 in the *Census Catalogue.*

BIBLIOGRAPHICAL NOTES.

LXVI.—THE WORD HERBARIUM.

THE Latin word Herbarium, originally used as the title of botanical works, has been applied in Latin books, at any rate since the time of Linnæus, to a collection of dried plants.*

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* Some interesting notes on early herbaria by Mr. Druce are reprinted in this Journal for 1890, pp. 276–8. I do not however think that the label on the back of an early (1606) collection—"Herbarum Divers[arum] Nat[uralium], etc.," can be regarded, as Mr. Druce supposes, as "the title of a collection of plants"; it seems to be incomplete.

The sense in which the word is now commonly employed in English books and speech is, according to the *New English Dictionary*, that which it bore when first adopted as an English word. Dr. Murray (*l. c.*) defines it as "a collection of dried plants systematically arranged; a *hortus siccus*; also a book or case contrived for keeping such a collection; the room or building in which it is kept"; and proceeds to cite what he presumably considers the two earliest instances of the use of the word. The definition is excellent and comprehensive; but the dates of both citations require correction.

The first citation stands:—"1776 Withering Brit. Plants (1796) i. 35. An Approved Method of Preparing Plants for an Herbarium." Both these dates are wrong. The first edition of Withering does not contain the passage cited, which is however contained in the third edition (1796). But it also appears in the third volume (1793) of the second edition:—"Where no better convenience can be had, the specimens may be disposed systematically in a large folio book; but a vegetable cabinet, called a Hortus siccus, or an Herbarium, is, upon all accounts, more eligible. In plate xii. you have a section of an Herbarium, in the true proportions it ought to be made, for containing a compleat collection of British plants." Judging from the way in which (pp. l, li) it is used in the third edition (1796) the word would appear to have been then in common use, as Withering employs it more than once—"the specimen of any plant intended for the Herbarium" (i. 33)—and his correspondent Mr. Whateley also uses it.

Dr. Murray's second quotations runs:—"1794 Martyn Rousseau's [Letters on] Bot. viii. 77. A *hortus siccus* or *herbarium*, by which Latin terms we call a collection of dried plants." This quotation—in which "viii" is the number of Rousseau's letter, not, as would appear, of a volume—is from "the third edition, with corrections and improvements" (1791); the words "or herbarium" (which also occur in the heading of the letter) do not appear in the first edition (1785), nor are they in the table of contents in 1791, where the letter is described as "viii. The manner how to form an Hortus Siccus, or collection of dried plants." Chronologically, then, Martyn's use of the word antedates Withering, though it may be noted that both *hortus siccus* and *herbarium* are printed by Martyn in italics, and are styled "Latin terms."

Dr. Murray, however, does not mention another meaning of the word Herbarium, to which it is the object of the present note to call attention. "Herbary," he shows, had the signification both of a collection of dried plants and of a place where herbs are grown; he cites Percivall's Spanish Dictionary (1591) as an example of its use in the former sense, though I am not convinced that it may not apply to the latter. It was certainly employed in this latter sense at the beginning of the last century. In vol. i. part 2 of the *Transactions of the Dublin Society* was issued a Catalogue of Plants in the Society's garden at Glasnevin (1800) on the title-page of which we read: "The Herbarium, Escarium, Foenarium . . . . . will be given in our next publication, as the Catalogues could not be made out in due time for this volume." The Catalogue begins with the description of the "Hortus Linnæensis":—"The first part of the arrangement is the Hortus Linnæensis, or Linnæan systematic ground, divided into three parts. 1st. The Herbarium, or herbaceous division, where all herbaceous plants, foreign and domestic, and their respective varieties, which bear the open air, are systematically arranged; at present about 4000 are cultivated. The next part of the systematic ground is the *Fruticetum*, or shrubbery, where all shrubs and low trees, and their respective varieties, which bear the open air, are systematically arranged. The third and last part of the Linnæan systematic arrangement is the *Arboretum*, or arbory." Other divisions are the Pecudarium, or Cattle Garden; Escarium, or Esculent Garden; Hortus Tinctorius, or Dyer's Garden; Fœnarium, or Hay Garden; and what should have been interesting—the "Hortus Hibernicus, or Hibernian Garden," "a collection of the several kinds, species, and varieties of trees, shrubs, and herbaceous plants peculiar to Ireland." With vol. ii. part 2 we have the "Catalogue . . . . containing the Herbarium, or Systematic Arrangement of Herbaceous Plants," the first page of which is headed "Herbarium, or Herbaceous Division." *

It may be of interest to some to quote Linnæus's description in the *Philosophia Botanica* of an Herbarium of dried plants:—

"HERBARIUM præstat omni Icone necessarium omni Botanico.

1. *Plantæ* non humidæ colligendæ.
2. *Partes* nullæ auferendæ.
3. moderate *explicandæ*.
4. non vero *inflectendæ*.
5. *Fructificatione* præsente.
6. *Siccandæ* inter papyra sicca.
7. *Citissime*, vix ferro calido.
8. *Prelo* modice compresso.
9. *Adglutinandæ* ichthyocolla.
10. in *folio* semper asservandæ.
11. *unica* tantum in pagina.
12. plagula non *alliganda*.
13. *Genus* supra adscribendum.
14. *Species* & Historia a tergo.
15. *Congeneres* inter *philyram* reponendæ.
16. Disponendæ ad *Methodum*."

JAMES BRITTEN.

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* This Catalogue is attributed by Mr. Jackson (*Guide to Literature of Botany*, p. 411) to W. Wade; there is, however, little doubt that it was compiled by John Underwood, the Superintendent of the Garden.

REVIEWS.

The Flowering Plants of Africa: An Analytical Key to the Genera of African Phanerogams. By Fr. Thonner. With 150 plates and a map. 4to, cloth, pp. xvi, 647. London, Dulau & Co., 1915 [1916]. Price 15*s*. net.

"This book supplies a long-felt want"—a phrase somewhat hackneyed and not always appropriately employed—may be accurately applied to the well-printed and in every way attractive volume whose title stands above. "Intended," as the preface informs us, "for the use not only of botanists but also of colonists and travellers in Africa who take an interest in botany," the author has "used, wherever it was possible, as distinctive characters those which are visible to the naked eye in a plant in flower, being careful however not to deviate too much from the natural system." Everybody connected with a public botanical institution knows how frequently such a volume has been asked for by intelligent folk of the classes indicated, and how impossible it has been up to now to satisfy their demand for some work in English which should be at once portable and reasonably complete; and this Dr. Thonner, with the help of Dr. Rendle, who has revised the translation, has now provided. The book was originally published in German in 1908 under the title *Die Blütenpflanzen Afrikas*, but this new edition makes its first appearance in our own tongue. Its general usefulness is greatly increased by the hundred and fifty excellent plates, mostly from drawings not previously published.

For the names and limits of the genera and families Engler and Prantl's *Pflanzenfamilien* is followed, with its supplement the *Genera Siphonogamarum* of Dalla Torre and Harms. The characters of each family are given with some fullness, and the key to the genera contains not only the actual diagnostic character, in terms as simple as is consistent with clearness, but indications of the number of species, geographical distribution, uses if any, and principal synonyms. Taking an example at random, we may cite the description of the genus *Tritonia*:

"Spathe-bracts short, brown, toothed at the top. Inflorescence spicate or paniculate. Perianth with a short or rather short tube. —Species 35. South and Central Africa. Many of them are used as ornamental plants: some yield edible bulbs or a substitute for saffron. (Including *Crocosmia* Planch., *Montbretia* DC., and *Tritonixia* Klatt.)"

There are no bibliographical references, but a "list of principal works consulted," from which periodicals are rather oddly omitted, precedes the text: this is one of the few unsatisfactory features of the work as, although dates and places of publication are given, it follows neither an alphabetical nor a chronological arrangement. There is a useful glossary, a good index of Latin and a less useful one of English popular names, and a statistical table showing the number of genera and species and the geographical distribution of each family. The printing is very carefully done: we note very few misprints—"*Prrteaceæ*" (p. 19) and "posionous" (for poisonous) (p. 538) are all that have attracted our attention.

It should perhaps be noted that the volume, although dated 1915, was not put on sale until the end of March of this year; the preface is dated September, 1913, and the text is hardly brought up even to that date, as the "additions and corrections" relate especially to the years 1911 and 1912. This should be borne in mind, as otherwise the compiler may be blamed for additions to our knowledge made since his book went to press.

Plants in Health and Disease. By F. E. Weiss, A. D. Imms, and W. Robinson. Longmans, Green & Co. 1916. Pp. 143. Price 1*s.* 6*d.* net.

Fungoid and Insect Pests. By F. R. Petherbridge. Cambridge University Press. 1916. Pp. 174. Price 4*s.* net.

The first of these books is "an abstract of a course of lectures delivered in the University of Manchester during the session 1915–16." The course was undertaken with a view to giving some assistance to those who were endeavouring, to the best of their ability, during the present crisis, to increase the productiveness of their gardens or allotments. One has heard rumours of the enormous success of the course; in any case the audience was so large that it was found advisable to issue to each member an eight-page summary of the lectures, and these summaries, seventeen in number, make up the present small volume. The first seven, by Professor Weiss, one of the most successful lecturers on popular botany, dealt with the life history of flowering plants and the effect of the special conditions met with in the Manchester district. This is the sane way of approaching pathological questions and is followed out in most of our Universities; but, unfortunately, although most graduates are as a rule quite capable of discussing the chemical constitution of chlorophyll and other somewhat intricate questions, they are frequently unable to identify the common fungus pests which are ably discussed by W. Robinson in the following five lectures of the series. The remaining lectures on insect pests make interesting reading and are doubtless of the same quality as regards accuracy as the others. The book is the best that could be placed in the hands of anyone who wishes an introduction to the combatting of the difficulties encountered by the practical man. It is to be regretted that the matter could not be extended, with a reproduction of the more essential of the diagrams shown at the lectures.

The first thing that strikes one about Mr. Petherbridge's book is its price, which will doubtless cripple the sale of what might otherwise be a successful book. After an introductory chapter devoted to the life histories of fungi various common forms are treated in the following six chapters. The accounts of these are accurate and the remedial methods suggested are those which are accepted as being the most effective. The remaining six chapters deal with the life cycles of different types of insect pests after a general introduction to insects. Methods of combatting the diseases are clearly stated. Judging from the number of excellent original figures (reproduced from photographs) we imagine that the author was more at home in this latter portion than in the earlier part of his book. It need not be said that the volume, being issued by the Cambridge University Press (as one of the new Farm Institute series) is admirably produced.

J. RAMSBOTTOM.

BOOK-NOTES, NEWS, &c.

ROLAND TRIMEN, who died at Epsom at the end of July, was the elder brother of Henry Trimen (1843–96), for many years Editor of this Journal, of whom some account, partly from his brother's pen, will be found in our volume for 1896 (pp. 489–94). It is there stated that both were at an early age devoted to natural history, and that it was decided between them that Henry should devote himself to botany and Roland to entomology. Born in London in 1840 and educated at King's College, Roland entered the Civil Service and went to the Colonial Office at Cape Town in 1860. Here he took up with enthusiasm the study in which he attained high distinction; Darwin was at that time engaged in the study of plant-fertilization by insects, especially in connection with orchids, and at his request Trimen examined *Disa grandiflora* and *Bonatea speciosa*; the result of his investigations appear in papers, illustrated by himself, in Journ. Linn. Soc. (Bot.) vii, 144 (1863) and ix, 156 (1865). Apart from these papers, Trimen's extensive and important work was exclusively entomological; he published a catalogue of South African butterflies, and numerous papers by him are enumerated in the Royal Society's Catalogue of Scientific Papers; he however made a collection of about 200 Cape plants, which he presented to the Department of Botany in 1871. From 1873 to 1895 he was Curator of the South African Museum at Cape Town; he became a Fellow of the Linnean Society in 1871 and of the Royal Society (which in 1910 awarded him the Darwin Medal) in 1883. Sir J. D. Hooker, in this Journal for 1873 (p. 353), named *Melianthus Trimenianus* in commemoration of the services of the brothers to botany and entomology respectively; Roland "accompanied Sir H. Barkly in his tour to Namaqua Land on the occasion of its discovery."

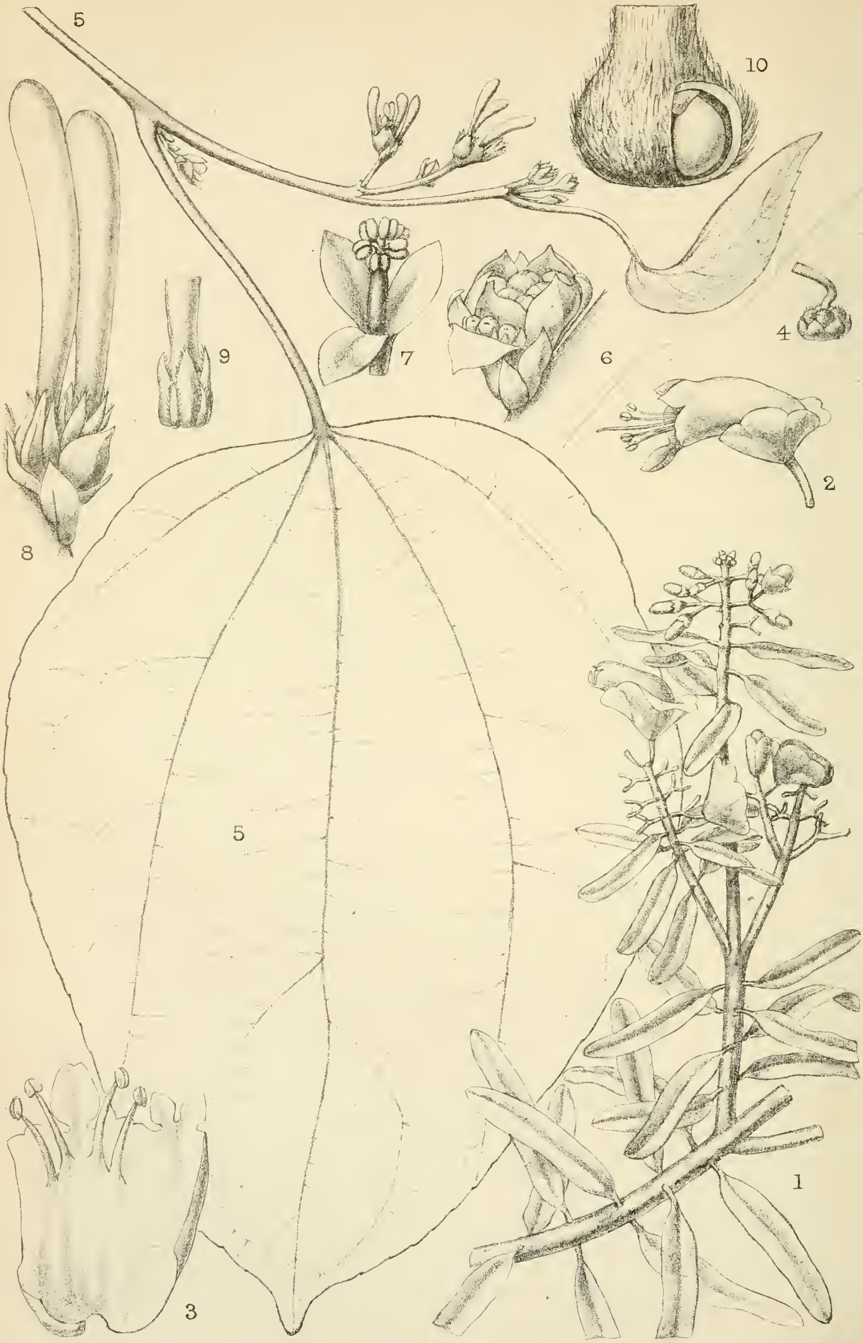
IN addition to the pamphlet on *Medicinal Herbs*, noticed in our last issue (p. 248), Mr. E. M. Holmes has published (at Ruthven, Sevenoaks) two others which should be useful to those who are taking up work in this direction. One, *The Cultivation of Medicinal Plants and the Collection of Wild Herbs in Britain*, is reprinted from the *Pharmaceutical Journal;* the other, on *The Cultivation and Drying of Medicinal Plants*, is a lecture delivered on behalf of the Central Committee for National Patriotic Organization. In this Belladonna, Foxglove, and Henbane are particularly dealt with. Each pamphlet contains 15 pages, and seems somewhat dear at 1*s.* 3*d.*—this applies especially to the first, in which the small and unpleasing type of the journal from which it is reprinted is employed. It is we think to be regretted that these useful pamphlets were not secured by the Royal Agricultural Society or some such public body which would have distributed them freely or produced them at a nominal cost.

BOTANY is almost unrepresented in the July number of the *Journal of Genetics* (vol. v, no. 4), which is mainly occupied by a beautifully and lavishly illustrated paper by Miss Rose Haig Thomas on "Colour and Pattern-Transference in Pheasant Crosses." Mr. R. H. Biffen, however, has a short article on "The Suppression of Characters in Crossing," as illustrated by experiments with forms of wheat.

THE Fungus Foray of the British Mycological Society will be held in the New Forest from the 25th to the 30th of this month. During the week Mr. E. W. Swanton will deliver his presidential address on "Education in Mycology," and Mr. Ramsbottom will read a paper "On The History of the Ustilaginales."

THE last number of the *Kew Bulletin* (July) contains a list of sixty-seven botanical drawings collected by the late Sir Arthur Church, which have been presented by his widow to the Royal Gardens, Kew. The list is accompanied by notes by Miss Matilda Smith on the various artists represented, in which—though this is not acknowledged—the *Biographical List of British Botanists* has been of much assistance—*e.g.* the short account of John Edwards is transcribed therefrom. Of the work of Peter Brown, five fine examples are in the collection of botanical drawings in the National Herbarium, a list of which might usefully be published: amongst these are the drawings for the *New Botanic Garden* by Sydenham Edwards—an artist represented in Church's collection by five examples.

Under "R. P. Nodder" Miss Smith writes: "An English painter of horses and other animals exhited at the Royal Academy from 1786–1820. He was appointed botanical painter to George III and after that exhibited a few flower pictures. No particulars of his life have been found." A reference to the *Dictionary of National Biography* (xli, 86) supplies information which suggests that two persons are confused in this paragraph. Richard P. Nodder, who "obtained some repute as a painter of horses and dogs and was an occasional exhibitor at the Royal Academy," appears to have been the son of Frederick Polydore Nodder, the botanical artist, who died about 1800—certainly before 1803—and could not therefore have exhibited in 1820. F. P. Nodder was employed by Banks to reproduce and complete for publication the drawings made by Sydney Parkinson during Cook's First Voyage: these and a large number of other drawings by him are in the National Herbarium. He supplied illustrations for various botanical works, and was "Botanic Painter" to Queen Caroline, wife of George III: he exhibited flower paintings at the Royal Academy in 1786.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1-4. Capitanopsis Cloiselii *S. Moore*

ALABASTRA DIVERSA—Part XXVI

By Spencer le M. Moore, B.Sc., F.L.S.

(Plate 544.)

(Concluded from p. 257.)

Gynura Brownii, sp. nov. Verisimiliter scandens caule satis folioso longitrorsum striato glabro, foliis petiolatis ovatis dentato-lobulatis basi obtusis rotundatisve glabris petiolis auriculatis, capitulis mediocribus circa 40-flosculosis in paniculam corymbiformem subdensam terminalem dispositis, pedunculis propriis involucrum subæquantibus glabris, involucri anguste campanulati phyllis circa 12 oblongis sub apice angustatis apice acutis dorso carinatis leviter papillosis additis calyculi phyllis paucis parvis linearibus, corollis exsertis flavis, achæniis adhuc maxime crudis anguste cylindricis pilosis quam pappi setæ scabriusculæ albæ multo brevioribus.

Hab. Uganda, Umbendi road 100 miles N.W. of Kampala; *E. Brown* (*Dümmer* 2723).

Folia ± 3 cm. long., circa 2 cm. lat.; petioli 7–15 mm. long., hujus auriculæ late reniformes, amplexicaules, raridentatæ vel fero omnino integræ, circiter 5 × 7 mm. Inflorescentiæ pedunculus 3–5 cm. long. Paniculæ 4–5 × 5–6 cm. Pedunculi proprii graciles, 5–8 mm. long. Capitula 10 × 6 mm. Involucri phylla 7 mm. long., in sicco brunnea, margine anguste scariosa. Calyculi phylla 3 mm. long. Corollæ inferne angustæ (ima basi paullo amplificatæ), sub limbo subito dilatato, 9 mm. long. Styli rami 2·5 mm. long. Achænia 1·25 mm., pappus 8·5 mm. long.

On sight this differs from *G. Taylori* S. Moore in the auricled leaves and larger heads with more numerous involucral leaves. *G. Meyeri-Johannis* & *G. Fischeri*, both of O. Hoffmann, are not represented at the Museum, but, according to the respective descriptions, diverge in several respects from the plant under notice; moreover as Hoffmann says nothing about the style-arms, they may both turn out to be species of *Crassocephalum*.

Gynura Buntingii, sp. nov. Herbacea, prostrata vel scandens, fere glabra; ramis e caule undulato nudo vel fere nudo ascendentibus sparsim foliosis ramulos abbreviatos plurifoliosos hac atque illac emittentibus; foliis sessilibus subsessilibusve lanceolatis vel lanceolato-oblongis raro lanceolato-ovatis obtusis vel obtuse acutis basi obtusis acutisve integris nonnunquam margine undulatis membranaceis primo sub lente pilosulis necnon margine ciliatis cito glabris; capitulis homogamis circa 27-flosculosis pro rata majusculis campanulatis in corymbum terminalem oligocephalum satis longe pedunculatum bracteatum laxum digestis; involucri phyllis 13 linearibus acuminatis marginibus membranaceis glabris additis calyculi phyllis paucis lineari subulatis quam sese multo brevioribus; flosculis luteis involucrum subæquantibus; achæniis anguste cylindricis 10-costatis glabris; pappi setis levibus albis.

Hab. Liberia, Bagwai; *R. H. Bunting*, 110, 122.

A trailing herb climbing, where opportunity offers, among lowly bushes of the scrub. The leaves may be as large as 5–6·5 × 1·5–2·5 cm., though usually they are smaller (25–35 × 7–10 mm.); they dry black above and greenish-grey below. Each of the longer leafy branches ends in an elegant lax corymb, usually of three or four capitula, which is 10 cm. in length including the peduncle; proper peduncles 1·5–3 cm. long, and linear bracts ± 4 mm. The often nodding capitula are 1·5 cm. long, and as much broad. Leaves of the involucre 12 mm. long, 1 mm. broad; of the calyculus 2–4 mm. long. The corollas are 11 mm. long, the slender tube, ·2 mm. in its lower part, is gradually enlarged till at the throat it has a width of ·4 mm.; its lanceolate lobes are 1·5 mm. long. Immature achenes 4–5 mm. long, and about ·5 mm. broad. Style-arms 4·5 mm., pappus 10 mm. long.

This is so remarkably like the Indian *G. sarmentosa* DC. that the two were at first surmised to be conspecific. The chief differences lie in the somewhat longer capitula of *G. Buntingii* with their more numerous involucral leaves, the shape of the corollas and the longer style-arms.

Crassocephalum libericum, sp. nov. Herbacea; caule repente passim radicante rarifolioso glabro ramos erectos graciles foliosos puberulos gignente, foliis parvis brevipetiolatis ovato-lanceolatis vel oblanceolatis basi apiceque acutis obtusisve margine dentatis vel denticulatis tenuiter membranaceis cito glabris; capitulis homogamis parvis terminalibus solitariis vel binis cylindrico-campanulatis erectis bracteatis pedunculis propriis elongatis filiformibus insidentibus; involucri phyllis 12, inter se inæquilatis lineari-oblongis acutis margine membranaceis glabris; calyculi phyllis paucis filiformibus ab involucro longe superatis; flosculis luteis circa 30 involucrum plane excedentibus; achæniis anguste cylindricis 5-costatis glabris; pappi setis scabriusculis albis.

Hab. Liberia, Bagwai; *Bunting*, 142.

An elegant little herb about a span high. Leaves mostly 20–30 mm. long by 7–11 mm. broad, the upper ones gradually diminishing in size and passing into the bracts; petioles 3–6 mm. in length. The corymbs are at most 10 cm. long, but sometimes shorter; their few bracts are filiform and ± 4 mm. long. Capitula 8 × 7 mm. Involucral leaves 7·5 mm. long, and ·5–1·2 mm. broad; leaves of the calyculus about 2 mm. long. Corollas 8 mm. long, the tube very slightly dilated in its upper part, and at the throat only ·3 mm. broad; lobes linear-lanceolate, ·5 mm. long. Style-arms 1 mm. long. The achenes, still immature, are 2 mm. long, and are crowned by a pappus five times that length.

In appearance this is like *C. rubens* (*Gynura cernua* Benth.), but very much diminished in size. It nearest affinity is with *C. Proschii* (*Gynura Proschii* Briq.), from Barotseland, a plant not represented in our herbaria; but this, besides its nodding always solitary heads, has those organs, according to the given

measurements, as broad as long, while the rose-coloured florets are longer than the pappus instead of shorter.

Senecio Swynnertonii, sp. nov. Herbacea, caule erecto simplici satis elato valido distanter folioso eminenter striato fistuloso glabro, foliis radicalibus—caulinis lanceolatis acutis vel acuminatis basi sæpe leviter amplexicaulibus crebro regulariterque calloso-dentatis tenuiter membranaceis glabris, capitulis mediocribus radiatis calyculatis multiflosculosis in paniculam terminalem corymbiformem polycephalam folia excedentem raribracteatam dispositis pedunculis propriis quam capitula plane longioribus insidentibus, involucri campanulati phyllis circa 20 lineari-oblongis sursum angustatis sphacelatisque dorso carinatis glabris, radii flosculis 11 ut disci ex involucro eminentibus flavis, styli ramis truncatis penicillatis, achæniis anguste cylindricis costatis glabris, pappi setis paucis scabriusculis albis.

Hab. Rhodesia, Mt. Chirinda; *Swynnerton.*

Folia ± 10 cm. long., 2·5–4 cm. lat., superiora minora in bracteas inflorescentiæ transeuntia, penninervia nervis lateralibus pluribus. Inflorescentiæ circiter 20 × 20 cm. Pedunculi proprii ± 3 cm. long. Capitula florescentia 12 × 14 mm., post floritionem 14 × 20 mm. Calyculi phylla circiter 7, anguste linearia. Involucri phylla 8 mm. long. Radii fll. laminæ late oblongæ, bidentatæ, longitrorsum 4-nerves, 7·5 mm. long.; disci corollæ inferne filiformes juxta medium subito amplificatæ, 6 mm. long. Achænia 5 mm., pappus 7 mm. long.

Apparently allied to *S. Burtoni* Hook. f., but different in several respects, *e.g.* in the foliage and the involucres and achenes.

SENECIO VERSICOLOR Hiern.

Hab. Rhodesia, Mt. Chirinda; *Swynnerton.*

Hitherto known only as an Angolan plant.

Senecio lactucæfolius, sp. nov. Herbaceus, perennis, caule valido erecto pluriramoso ramis subdistanter foliosis minute glanduloso-pubescentibus, foliis radicalibus longipetiolatis ovatis obtusis nisi apice rotundatis basi obliquis plus minus truncatis (petiolo interdum lobo vel lobis duobus onusto) margine dentato vel dentato-undulato supra scabriusculo subtus præsertim in nervis pilis brevibus glandulosis præditis, foliis caulinis sessilibus lanceolatis vel lanceolato-ovatis apice mucronatis basi auricula magna amplexicauli dentata gaudientibus, capitulis homogamis mediocribus circa 27-flosculosis in paniculam laxam corymbosam dispositis, pedunculis propriis quam involucra longioribus ut paniculi rami glanduloso-pubescentibus, involucri campanulati extus glanduloso-pubescentis phyllis circa 12 lineari-oblongis obtuse acutis apice ipso sphacelatis marginibus membranaceis additis paucis exterioribus filiformibus calyculum efficientibus, flosculis purpureis, achæniis anguste cylindricis pluricostatis glabris, pappi setis caducis glabris albis.

Hab. Rhodesia, Melsetter; *Swynnerton.*

Folio radicalia (incluso petiolo) usque ad 18 × 19 cm., sæpe 6–10 × 3–4 cm., petiolus solus plerumque 3–8 cm. long. Folia caulina ± 10 × 3·5 cm., juniora imminuta tandem in bracteas paniculæ transeuntia. Panicula circiter 15 × 10 cm. Pedunculi proprii ± 1·5 cm. long., bracteas ultimas perpaucas filiformes sustinentes. Capitula 9 × 6 mm. Involucri phylla 8 mm. long., calyculi circa 5 mm. Flosculi subinclusi. Corollæ vix 6 mm. long., superne amplificatæ. Styli rami truncati, penicillati, 1 mm. long. Achænia 3 mm., pappus 5·5 mm. long.

The most obvious distinction between the above and *S. purpureus* L. is seen in the cauline leaves with their large auricles.

Euryops (§*Angustifoliæ*) **Brownei**, sp. nov. Caulescens, caule erecto crebro folioso glabro, foliis sublaxe imbricatis sessilibus elongatis anguste linearibus obtusis basi aliquanto dilatatis margine microscopice serrulatis carnosulis glabris, pedunculis axillaribus monocephalis foliis subæquilongis pubescentibus, capitulis mediocribus multiflosculosis, involucri medium usque partiti phyllis circiter 18 subbiseriatis triangularibus acutis nisi obtusis longitrorsum nervosis apice retusis, achæniis hucusque valde crudis turbinatis pappi setis numerosis intricatis caducissimis onustis.

Hab. Mt. Kenia, 9000 ft.; *Lieut. Orde Browne.*

Folia pleraque 1·5–2 cm. long., ægre 1 mm. lat., in sicco læte viridia, juniora ascendentia seniora patula. Pedunculi longit. 2 cm. paullulum excedens. Capitula 1·5 cm. diam. Involucri phyllorum pars divisa 2 mm. long. Ligulæ 5·5 × fere 3 mm., recurvæ. Achænia ·75 mm. long.; pappi setæ achænia duplo excedentes, sordide albæ.

In habit and foliage this has much resemblance to *E. Jacksoni* S. Moore, but its shorter pubescent peduncles and smaller heads enable the two to be distinguished on sight.

EURYOPS OSTEOSPERMUM S. Moore.

Hab. Rhodesia, Mt. Chirinda; *Swynnerton.*

The type specimen came from Salisbury.

CENTAUREA RHIZOCEPHALA Oliv. & Hiern. VAR. AUSTRALIS var. nov. A typo abhorret præsertim ob capitula breviora necnon angustiora (1·5 × 1·3 cm.) et involucri phylla pallida spinis debilioribus onusta.

Hab. Rhodesia, Mazoe; *Eyles*, 397: Salisbury; *R. F. Rand.* (Also at Kew—between Broken Hill zinc mine and Bwana M'cuba copper mine; *C. E. F. Allen.*)

Mr. Eyles writes of this: "Coming up on burnt veld flats and vleis; clumps of white flowers close to ground with spiny involucres just in crust of soil and long tapering woody rootstock." This latter, as shown by Mr. Eyles' specimen, can reach a length of nearly 30 cm., with a breadth of 1 cm. at soil level, whence it gradually tapers off so as to measure only half as broad. This is a remarkable variety which may perhaps turn out not to be conspecific with the northern plant.

Gerbera Welwitschii, sp. nov. Spithamea vel paullulum ultra vel minus, caudice brevissimo longe albo-lanato, foliis ovatis vel obovato-oblongis obtusissimus basi rotundatis vel in petiolum brevem nisi longum longissimumve gradatim angustatis integris vel undulato-denticulatis supra pilis longis appressis pubescentibus dein puberulis vel fere omnino glabris subtus arctissime albo-tomentosis, scapo folia facile superante fulvo-tomentoso, involucri phyllis lineari-lanceolatis acuminatis dense fulvo-tomentosis, ligulis pluribus involucrum excedentibus, achæniis cylindricis tomentosis, pappi setis scabriusculis dilute fulvis.—*Gerbera piloselloides* O. Hoffm. in Boll. Soc. Brot. x, 185 (non Sch. Bip.): Britten in Trans. Linn. Soc. ser. II, iv, 22. *Perdicium abyssinicum* Hiern, Cat. Welw. pl. i, 615.

Hab. Angola; *Welwitsch*, 3599, 3600, 3601, 3602, 3603: junction of rivers Longa and Lazingua; *Baum*, 641. Nyassaland; *Buchanan*, 992: Milanji Mt.; *A. Whyte*, 111, *Mrs. Arthur Shinn*: Nyika plateau; *Miss Henderson.*

Some Rhodesian specimens referable to this species with leaves densely velvety above, the "velvet" remaining for a time and possibly in some cases permanently, may be distinguished as

VAR. VELUTINA. Rhodesia, Mt. Pene, 6500–7000 ft.; *Swynnerton* 1821, 6113: Mt. Chirinda; *Swynnerton.*

This species is known at sight from *S. abyssinica* Sch. Bip. by the leaves with the dense tomentum covering their underside.

Crepis Swynnertonii, sp. nov. Scaposa, foliis radicalibus oblanceolato-oblongis obtusis vel obtusissimis apice ipso mucronatis inferne in petiolum brevem sensim coartatis margine dentatis tenuiter membranaceis glabris additis perpaucis scapo affixis quam cetera argutius dentatis sessilibus necnon basi leviter amplexicaulibus, scapo folia facile excedente bracteis perpaucis parvis prædito glabro, capitulis mediocribus in paniculam laxissimam oligocephalam ordinatis, pedunculis propriis filiformibus capitula sæpissime longe excedentibus bracteis parvulis filiformibus onustis, involucri campanulato-cylindrici phyllis int. 12–14 lineari-oblongis apicem versus leviter angustatis apice obtusis dorso obscure carinatis præsertim basi cinereo-puberulis exterioribus paucis brevibus necnon bracteis ultimis similibus, receptaculo plano nudo, flosculis pro capitulo circiter 30, achæniis anguste linearibus aliquanto compressis superne leviter gradatimque attenuatis pluricostatis microscopice papillosis, pappi setis quam achænia paullulum brevioribus scabriusculis sordide albis.

Hab. Rhodesia, grazed pasture near Chipete; *Swynnerton.*

Rhizoma 1 cm. crass. Folia radicalia 10–18 cm. long. (incluso petiolo circa 1 cm. long.), 2·5–4·5 cm. lat. Folia e scapo oriunda 7–13 cm. long. Inflorescentia (scapo ipso 30 cm. long. haud exempta) fere 60 cm. long. Panicula circa 11 cm. diam. Pedunculi proprii sæpius 4–6·5 cm. long., superiora breviora; horum bracteæ 3 mm. long. Involucra 7 mm. long. Corollæ plane exsertæ, ligulis dentatis flavis. Achænia 7 mm., pappus 6 mm. long.

Seems allied to *C. bumbensis* Hiern, but the foliage and achenes of the two are dissimilar.

A Swynnerton specimen from Mt. Chirinda with smaller leaves (6–8 cm. long) seems referable to this species.

Crepis chirindica, sp. nov. Herba scaposa, foliis radicalibus rosulatis e rhizomate crasso pluribus sessilibus oblanceolato-oblongis obtusis nisi obtusissimis basin versus gradatim angustatis margine plerumque distanter brevissimeque denticulatis supra glabris subtus scabriusculis necnon in costa centrali aliquantulo hispidulis, scapis cæspitosis folia longe excedentibus erectis sursum (raro inferne) ramosis ramis paucis elongatis monocephalis striatis saltem prima juventute hispidis, involucri campanulati phyllis interioribus circa 12 anguste lanceolato-oblongis obtusis margine anguste scariosis dorso hispidis quam phylla exteriora linearia facile longioribus, achæniis oblongis aliquanto compressis superne in rostrum satis longum gradatim attenuatis crebro costatis costis microscopice papillosis, pappi setis scabriusculis albis.

Hab. Rhodesia, Melsetter District; *Swynnerton.*

Rhizoma 1·5 cm. diam. Folia pleraque 7–10 cm. long., ultra medium ± 1·5 cm. lat., in sicco griseo-viridia. Scapus fere 50 cm. alt.; hujus bracteæ pauceæ, seniores 1·5–2 cm., juniores circa 5 mm. long.; rami florigeri summum 15 cm. long., solemniter 5–10 cm. Capitula pansa 15 × 15 mm. Involucri phylla ext. ± 5 mm., phylla int. 12 mm. long. Achænia in toto 10 mm. long.; hujus rostrum 5 mm. long. Pappus 7 mm. long.

This too is near *C. bumbensis* Hiern, which it greatly resembles in habit; it is, however, different in the capitula and the achenes.

Crepis simulans, sp. nov. Herbacea scaposa foliis radicalibus arcte approximatis sessilibus e rhizomate sat crasso oriundis oblongo-oblanceolatis obtusis basin versus sensim coarctatis margine dentatis utrobique hispidulo-glanduloso-pubescentibus, scapis cæspitosis folia excedentibus erectis superne rariramosis inferne bracteas perpaucus foliis similes sed minores levissimeque amplexicaules gerentibus, capitulis mediocribus pluriflosculosis corymbum oligocephalum referentibus, pedunculis propriis erectis quam involucra manifeste longioribus, involucri campanulati phyllis int. 12 anguste oblongo-lanceolatis obtusis margine scariosis dorso hispidulo-pubescentibus quam phylla ext. longioribus, achæniis auguste linearibus subteretibus sensim in rostrum quam sese brevius desinentibus optime costatis microscopice papillosis, pappi setis scabriusculis sordide albis.

Hab. Rhodesia, Mt. Chirinda; *Swynnerton.*

Folia 2·5–8 cm. long., 12–18 mm. lat., membranacea. Scapus summum 30 cm. alt., longitrorsum sulcatus; hujus bracteæ inferiores 3–4 cm. long., superiores lineares ± 7 mm. long. Pedunculi proprii ± 5 cm. long. Capitula florescentia 10 × 7 mm., fructescentia 13 × 10 mm. Involucri pylla int. 9 mm., ext. circiter 6 mm. long. Achænia in toto 7 (raro 8) mm. long., hujus rostrum 3 mm. Pappus 5 mm. long.

Differs from the last in the indumentum, the toothed leaves, and the smaller heads and achenes.

In leafy stages this greatly resembles *Tripteris amplexicaulis* Less.

Crepis ephemeroides, sp. nov. Herba scaposa, foliis radicalibus paucis parvis sessilibus anguste oblongo-oblanceolatis obtusis margine subdistanter denticulatis utrobique scabriusculis, scapis folia multo superantibus erectis superne (interdum basin versus) rariramosis glabris, capitulis parvis in corymbum laxum oligocephalum dispositis, pedunculis propriis capitula sæpissime multo excedentibus, involucri anguste campanulati phyllis int. circa 13 lineari-oblongis acuminatis margine obscure scariosis dorso carinulatis necnon griseo-puberulis quam phylla ext. pauca longioribus, achæniis anguste cylindricis basin versus leviter angustatis apice truncatis longitrorsum subtiliter pluricostatis glabris, pappi setis inferne dilute stramineis alibi sordide albis glabris.

Hab. Rhodesia, Mt. Chirinda; *Swynnerton.*

Rhizoma sursum 5 mm. diam. Folia 5 cm. long., 7 mm. lat. Scapus 30–40 cm. alt., longitrorsum striatus; hujus bracteæ paucæ, lineares, ± 3 mm. long. Pedunculi proprii plerique ± 3 cm. long. Capitula florescentia 8 × 5 mm. Involucri phylla int. 5 mm. long., ext. 2–3 mm. Achænia ægre 3 mm., pappus 5 mm. long.

Differs from the Angolan *C. ephemera* Hiern chiefly in the foliage, the smaller heads, and the longer and narrower achenes.

ERICACEÆ.

Ericinella Shinniæ, sp. nov. Verisimiliter suffrutex crebro ramosus, ramulis ascendentibus scabridis, foliis ascendenti-patentibus quaternatim (anne semper?) verticillatis (verticillis nequaquam arcte imbricatis) breviter petiolatis oblongo-lanceolatis breviter mucronulatis supra planis leviterve concavis dorso convexis necnon in medio sulcatis margine distanter scabro-ciliolatis ceteroquin glabris, floribus longiuscule pedicellatis pedicellis ebracteolatis glabris, calycis quam pedicellus plane brevioris segmentis lineari-lanceolatis ciliolatis uno foliaceo quam cetera decoloria duplo longiori, corollæ campanulato-tubularis calycem facile superantis lobis 4 brevibus deltoideis, staminibus 4 filamentis satis elongatis antheris medium usque bifidis basi prominenter aristatis, ovario 4-loculari, stylo exserto, stigmate paullulum dilatato truncato, ovulis pluribus.

Hab. British Central Africa, Milanji Mt.; *Mrs. Arthur Shinn.*

Ramuli ultimi maxima pro parte 2–5 cm. long., primo omnimodo foliacei deinde foliorum delapsorum cicatricibus parum eminentibus plus minus onusti, ·4 mm. diam. Folia 2·5–3 mm. long., 1 mm. lat., in sicco griseo-viridia, aliquantulum nitentia. Pedicelli 2·5–3 mm. long. Calycis segmentum majus 1·5 mm., segmenta cetera 1 mm. long. Corolla 2·5 mm. long., sursum 1 mm. diam.; tubus 1·75 mm. long., inferne carinulis 4 plus minus perspicuis percursa. Filamenta ægre 1·5 mm., antheræ (calcare puberulo ·3 mm. long. incluso) 1 mm. long. Ovarium subglobosum, 4-sulcatum, glabrum, ·65 mm, long.; stylus glaber, 1·75 mm. long.

Distinguished from its congeners by the stigma; from *E. Mannii* Hook. f. also by the foliage.

OLEACEÆ.

Jasminum Buchananii, sp. nov. Suffrutex ramulis foliosis griseo-pubescentibus, foliis simplicibus parvis oppositis brevipetiolatis ovatis vel ovato-oblongis obtuse mucronatis vel obtusissimis basi obtusis rotundatisve chartaceis supra puberulis subtus pubescentibus, cymis ad apicem ramulorum sessilibus vel breviter pedunculatis 2–3-floris, pedicellis calyce plane brevioribus, calycis (ut pedicelli) pubescentis tubo lobos 5–8 lineari-subulatos paullulum excedente, corollæ tubo quam calyx circa 4-plo longiore lobis 5–8 oblongis obtusis tubum semiæquantibus, antherarum connectivo mucronulato, stigmate oblongo acuto apice exserto.

Hab. British East Africa, Bura; *Lieut. A. Buchanan.*

Folia sæpius 1·5–2·5 cm. long., rarius 3 cm. vel paullulum ultra attingentia, 10–15 (rarius 18) mm. lat., in sicco virentia; costæ laterales utrinque 2–3, nequaquam perspicuæ; petioli 2–3 mm. long. Pedunculi dum adsint nec ultra 5 mm. long., pubescentes. Pedicelli 1–2 mm. long. Calyx 5–7 mm. long.; tubus 3–4 × 2–2·5 mm.; lobi 2–3·5 mm. long. Corolla alba; tubus circa 20 × 1·5 mm.; lobi 10 mm. long. Antheræ 2·5 mm. stigma 3·5 mm. long.

To be inserted next *J. Kirkii* Baker, differing from it chiefly in the small more hairy leaves, the sessile or but shortly stalked cymes, and the narrow lobes of the calyx.

BORAGINACEÆ.

Cordia ugandensis, sp. nov. Arbor ramis validis eximie sulcatis pubescentibus novellis arcte tomentosis, foliis alternis longipetiolatis late ovatis obtusissimis basi aliquanto cordatis margine dentatis vel dentato-undulatis trinervibus supra scabriusculis subtus molliter griseo-pubescentibus, inflorescentiis terminalibus sat longis e cymis pluribus pedunculatis pubescentibus sistentibus, floribus parvis pedicellis brevissimis pubescentibus suffultis, calyce anguste campanulato subtiliter tomentoso in lobos 3 breves irregulariter rupto, corollæ tubo infundibulari calycem vix æquante ægre usque medium diviso limbo 5–7-lobo, staminibus subinclusis faucibus insertis, ovario sparsissime glanduloso apice pilis paucis erectis albis munito.

Hab. Uganda, grassy hillside at Kijude, 4000 ft,; *Dümmer*, 2727.

Arbor circa 25 ped. alt. Rami sub inflorescentia fere 1 cm. diam., foliorum delapsorum cicatricibus prominentibus notati. Folia usque ad 35 × 25 cm., juniora 13–17 × 9–12 cm., membranacea, supra in sicco olivaceo-fusca subtus griseo-viridia; costæ laterales utrinque 4–5, ut costa centralis supra fere planæ subtus eminentes; petioli foliorum majorum saltem 16 cm. long., juniorum modo 4 cm., omnes piloso-pubescentes. Inflorescentiæ saltem 20 cm. long., totidem circiter lat.; cymarum ramuli patentes, usque ad 10 cm. long., plerumque revera breviores. Flores albi. Calyx 7–10 mm. long., lobis 2–3 mm. long. haud exemptis. Corollæ tubus 8 mm. long.; lobi ovato-oblongi,

superne crispati, 6–7 mm. long. Filamenta 6 mm. long.; antheræ 3 mm. Ovarium 1·8 × 1·5 mm.

C. Yombomba Vaupel, known to me by description only, to which this is evidently allied, besides leaves in certain minor respects different, has smaller flowers with stamens inserted near the base of the corolla instead of just below its mouth. Although several flowers in all stages were examined in no case was the stigma seen.

ACANTHACEÆ.

Barleria (§ *Somalia*) **maculata**, sp. nov. Suffrutex ramosus ramulis foliosis cinereo-strigilloso-pubescentibus, foliis parvis breviter petiolatis oblongo-obovatis apice basique obtusis pagina utravis pilis simplicibus appresse strigillosis vestitis, floribus subsessilibus ex axillis superioribus solitatim oriundis, bracteis foliis similibus nisi paullo minoribus, calycis herbacei cinereo-pubescentis segmentis exterioribus ovatis integris basi rotundatis segmento postico obtuso quam anticum bilobum lobis deltoideis acutiusculis præditum paullo majori segmentis lateralibus quam exteriora paullo brevioribus lineari-lanceolatis acuminatis, corollæ extus fere glabræ tubo ex calyce plane eminente anguste infundibulari lobis quam tubus paullo longioribus inter se subæqualibus (lobis 2 posticis ceteris parum minoribus lobo antico paullulum altius soluto necnon latiori), staminibus breviter exsertis staminodiis subulatis, ovario superne pubescente, stylo exserto glabro, ovuli secundi rudimento minutissimo.

Hab. British East Africa; *Lieut. A. Buchanan.*

Rami ramulique graciles, 1–2 mm. diam. Folia ± 10 × 7 mm. (raro 17 mm. attingentia), utrinque glandulis rubris microscopicis pilis intermixtis induta, in sicco grisea; petioli 3–4 mm. long. Flores dilute violacei. Calycis lobus posticus 11–13 × 7–8 mm., 5-(6-) nervis; lobi antici 10–11 × 7–8 mm., 7-nerves, horum lobi 2–3·5 mm. long. Corolla 28 mm. long.; tubus 14 mm. long., inferne 2–2·5 mm. lat., faucibus ægre 5 mm. Filamenta 15 mm. antheræ 3 mm. long. Ovarium 3·5 mm. long., stylus 20 mm.

From *B. Hochstetteri* Nees this is easily distinguished by the foliage and the larger calyx with its united anticous lobes bifid. Externally the corolla has a few small hairs on the throat, and near the base a number of microscopic pellucid glands.

JUSTICIA MAXIMA, comb. nov. (*Duvernoia maxima* Lindau in Engler Bot. Jahrb. xlix, 405).

Hab. Uganda, Badongo forest, 4000 ft.; *Dümmer*, 2583.

This species was described from South Cameroons material; the identification therefore, if correct, increases notably its range. Description and measurements fit in very well with Mr. Dümmer's plant; the only point worthy of mention being that the hinder segment of the calyx is only half as wide as the others. This, if it be also the case with the Cameroons specimens, has been overlooked by Lindau. Mr. Dümmer notes the flowers as creamy in colour. The large capsules are a remarkable feature.

VERBENACEÆ.

Clerodendron (§ *Eu-Clerodendron*) **validipes**, sp. nov. Frutex scandens, glaber, caule robusto subtereti striato lenticellifero, foliis oppositis vel suboppositis nonnunquam vero alternis ovato-oblongis cuspidato-acuminatis apice ipso obtusis basi rotundatis tenuiter membranaceis subnitidis petiolis sat longis inferne validis persistentibusque superne tenuioribus necnon deciduis fultis, floribus parvis in paniculam gracilem thyrsoideam sat laxam foliis longiorem digestis, pedicellis filiformibus calyce brevioribus, calycis cylindrico-campanulati tubo quam lobi circa duplo longiore, corollæ tubo ex calyce breviter eminente subrecto subcylindrico basi leviter ampliato lobo antico cymbiformi lobis ceteris planis, staminibus usque ad 5–6 mm. exsertis, stylo staminibus paullo longiore.

Hab. Uganda, forest at Gaba; *Dümmer*, 2642.

Caulis 3·5–5 mm. diam., in sicco olivaceus, lenticellis parvis linearibus fusiformibusve notatus. Foliorum limbus 9–10 × 4–4·5 cm., in sicco læte viridis; costæ laterales utrinque 4–5, distantes, aperte arcuatæ, ut costa media reteque sublaxum utrobique (sed præsertim pag. inf.) aspectabiles; petioli in toto circa 30 mm. long., horum pars basalis persistens 10–20 mm. long., a basi 3–4 mm. lat. gradatim attenuata; pars decidua cum basali angulum acutum formans, circa 1 mm. lat. Panicula 20 cm. long., circiter 4 cm. lat.; hujus rami plus minus patentes, 7–12 mm. long.; bracteæ lineares, 2–3 mm. long.; pedicelli 2–3 mm. long. Calyx 8 mm. long. lobis fere 2·5 mm. long. inclusis. Corollæ albæ tubus 9 mm. long., sub limbo fere 2 mm. lat.; lobus anticus 4·5 mm. long.; lobi ceteri ovati, antico paullulum breviores. Stylus 15 mm. long.

In flower this greatly resembles *C. nuxioides* S. Moore and related species (*C. Preussii* Gürke, *C. Buchholtzii* Gürke), but the corolla with tube scarcely longer than the calyx at once distinguishes it. The long persistent bases of the petioles are a striking feature, also the frequent subopposition or even alternation of the leaves.

LABIATÆ.

Plectranthus (*Germania*) **buraensis**, sp. n. Herbaceus, verisimiliter circiter spithameus, caule abbreviato inferne ramoso ut rami glanduloso-pubescente, foliis paucis longiuscule petiolatis suborbicularibus obtusis basi late truncato-rotundatis margine subgrosse crenatis membranaceis supra pilis albis brevibus appressis puberulis subtus in nervis puberulis aliter glabris, spicastris paniculatis folia longe excedentibus glanduloso-pubescentibus, verticillastris inter se ± 1 cm. distantibus sessilibus 4–6-floris, bracteis parvulis orbicularibus persistentibus, pedicellis calyces certe excedentibus cito patentibus glanduloso-pubescentibus, calycis campanulati glanduloso-pubescentis tubo limbo æquilongo lobo postico ovato obtuso saltem in sicco atrocæruleo lobis reliquis lanceolatis acuminatis lateralibus quam antici paullo brevioribus, corollæ extus pubescentis tubo longe exserto paullo supra basin subito defracto superne ampliato labii postici lobo intermedio quadrato retuso lobis lateralibus brevibus latisque labio antico quam posticum paullo breviore cymbiformi, genitalibus inclusis.

Hab. British East Africa, Bura; *Lieut. A. Buchanan.*

Folia profecto evoluta 3·5 × 3·5 cm.; costæ laterales utrinque 4, supra planæ, subtus eminentes; petioli summum 2·5–3 cm. long. Spicastrum 20 cm. long. Bracteæ gradatim imminutæ, infimæ 5 × 5 mm. vel paullulum majores, superiores 2–3 mm. long. et lat., omnes virides. Pedicelli plerique 4–5 mm. long. Calyx florescens 4 mm. long.; labium posticum 2 × 2 mm.; lobi laterales 1·5 mm. long.; lobi antici 2 mm. long. Calyx fructescens 6·5 mm. long., hujus labium posticum 3 × 3 mm. Corolla alba; tubus 7 mm. long., basi 1·5 mm., faucibus 2·5 mm. lat.; labium posticum 7 mm., labium anticum 5 mm. long. Nuculæ ovoideæ, brunneæ, glabræ, 1·5 mm. long.

Near *P. flaccidus* Gürke, which has among other features different foliage and clothing.

AMARANTACEÆ.

Celosia debilis, sp. nov. Planta semispithamea caule debili subdistanter folioso glabro, foliis alternis sessilibus linearibus obtusis glabris, floribus in spicam unicam terminalem obovoideam paucifloram ordinatis, bracteis lanceolatis acuminatis calyce brevioribus, perianthii segmentis ovato-oblongis acuminatis roseis, filamentis subulatis, staminodiis interjectis 0, stylo exserto apice breviter bifido, ovulis 3.

Hab. Uganda, roadside near Kyobana, 4000 ft., *Dümmer*, 2647.

Folia 1–2 cm. long., sæpius 1–2 mm. lat., inferiora basin versus extenuata ita petiolum mentientia, summa pauca imminuta. Spica rite evoluta circa 1 × 1·3 cm. (speciminis vero alterius 6 × 9 mm.). Bracteæ sæpius 4–5 mm. long. Perianthii segmenta inter se subæqualia, 7–8 mm. long. Andrœcii tubum fere ·75 mm. alt. Filamenta 1·25 mm. long.; antheræ 1·25 mm. long. Ovarium subglobosum, fere 2 mm. diam.; stylus 5·5 mm. long.

A very distinct species, easily recognised from the characters given.

Among the species above described are specimens recently communicated to the Museum by three correspondents, *viz.* Lieut. Orde Browne, R.A., who botanised on Mt. Kenia, Lieut. A. Buchanan (British East Africa), and Mrs. Arthur Shinn (Mt. Milanji district). A collection made in 1911–12 by Mr. Swynnerton in Rhodesia has also been drawn upon, as well as consignments sent by Mr. Gossweiler from Angola and Mr. R. Dümmer from Uganda.

EXPLANATION OF PLATE 544.

1–4. *Capitanopsis Cloiselii.* 1. The plant, nat. size. 2. A detached flower, nat, size. 3. Corolla opened, × 1½. 4. Ovary with disc and bent base of style, × 2. 5–10. *Megalostylis Pœppigii.* 5. Small portion of plant, nat. size. 6. Male inflorescence, × 4. 7. Same opened, showing the stamens on their column, × 8. 8. Two female flowers surrounded by their bracts, × 4. 9. Calyx of a female flower with the base of the style, × 4. 10. Ovary with one cell opened at the side showing the single ovule, × 8.

NOTES ON MISTLETOE.

By Dom Ethelbert Horne.

The following experiments and observations have been made during the last five years. I should state that I am not a botanist, but only an observer, and in this and other branches of natural history I hope I can observe minutely and record fairly accurately. The experiments with the seeds recorded below were made at Downside Abbey, about twelve miles from Bath, and situated some 600 feet above sea level, on the Mendip Hills. Mistletoe does not grow naturally anywhere in the immediate neighbourhood, the nearest place where it may be found being five miles away. The orchard where I have watched the *Viscum* in flower is on the outskirts of the city of Hereford, and the parasite grows there in extraordinary abundance. On one fairly small apple-tree I counted twenty-eight distinct bunches, so that I had an ample opportunity of observing plants widely differing in age and situated in different aspects.

I. Growth.

On January 21st, 1911, I squeezed a number of seeds from ripe mistletoe berries and placed them on a "Glastonbury" thorn. By March 31st these seeds were beginning to send out radicles, and by the 1st of the following May these radicles were about half their full length and their tips were enlarging. A fortnight later the radicles appeared to be full length and the disks at their tips were expanded and fixed firmly down on to the bark of their host. In August and September the exhausted seeds fell from the tree and the free end of the radicle quickly shrunk down to the disk, which became slightly convex. In May, 1912, each disk sent out from this raised centre a pair of stems about half an inch in length, bearing at their ends a pair of seed-leaves. From the end of the month there appeared to be no further growth. In May, 1913, a single stem was produced between each of these pairs of seed-leaves, having a pair of true leaves at their extremities. Growth appeared to cease in about six weeks. In May, 1914, a pair of stems came out between each pair of leaves, and this method of increase was continued in the plants the following year, except that in one case three stems issued. In April, 1916, these plants flowered for the first time. There were two male and two female plants, but one of the latter is probably only produced from a "runner" under the bark. The male plants are from two distinct seeds. The seed-leaves were shed when the true leaves appeared, and by 1914 none of the plants retained them. One plant, the year following the issue of the first stem, sent out another at the same spot, but this carried true leaves—it was evidently of the nature of a shoot from an established plant.

There appear to be two kinds of mistletoe seeds—those that produce but one radicle and those that produce two or more. The former are oblong in shape and the latter triangular. In the paper by the late Dr. Bull of Hereford on *Viscum album* (Trans. Woolhope Club, 1852–1865, p. 312) he states that out of 36 seeds taken at random, 25 had a pair of radicles. I put 30 seeds, also taken haphazard, in a patch on the trunk of a plane-tree. Three of these were lost, and of the remaining 27, two radicles came from 19, which is almost exactly the same proportion as in Dr. Bull's experiment. But where he obtained only 4 seeds with single radicles out of 36, I grew 7 out of 27—a very much larger proportion. Also in the older experiment 7 seeds had 3 radicles, whereas I had only 1. I am removing all the seeds except the 7 singles, which I hope to grow in order to see whether this fact has any influence on sex.

II. Fertilization.

The manner in which fertilization is effected is somewhat difficult to follow. Those who have written on the subject do not seem to record the dates at which their observations were made, and much depends on this. In the Herefordshire orchard, above mentioned, the *Viscum* was in flower this year (1916) from the last few days of January, throughout February and March, and was over by the beginning of April. The oldest plants flower earliest and the youngest latest. At one time mistletoe was classified as anemophilous. Knuth (*Handbook of Flower Pollination*, translated by J. Ainsworth Davies, Clarendon Press, 1909, iii, p. 360) says: " Kölreuter declared positively in 1762 that mistletoe is entomophilous, but the plant was considered anemophilous for a long time, until Loew's investigations proved entomophily beyond doubt." He then quotes Kölrenter's and Loew's observations at length, but neither author specifies the insect visitants: the former states the pollination " is effected entirely by insects and indeed chiefly by various genera of flies " : the latter " was unable to observe pollinators, but supposed these to be short-tongued bees . . . [he] thinks early flying species of *Andrena* are pollinators . . . some of which appear as early as the middle of March, the flowering time of the mistletoe." Kirchner (Jahresheft. Ver. Natk. Stuttgart, xlix, 1893, p. 104) says: " Both male and female flowers clearly secrete nectar, the male ones usually less than the female, the latter being sometimes full up to the tips of the perianth lobes. These in the male flower at the beginning of anthesis are so upright that the brittle pollen bursting from its receptacles bars the way to the base of the blossom, and must therefore adhere to the proboscis of an insect probing for nectar. . . ." " Visitors.—The following were recorded by the observers stated: Kirchner, the honey-bee, only visiting the male stocks, and leaving alone the smaller feebly odorous female flowers, which of course yield no pollen. Pollination is effected by flies: *Pollenia rudis* (freq.), *P. vespillo* (do.), *Spilogaster duplicata* (less freq.), which visit flowers of both kinds. Bonnier saw the honey-bee" (Knuth, p. 362).

One must note that neither Kölreuter nor Loew name any insects in particular as pollinators, the former contenting himself with the general statement that pollination "is effected entirely by insects . . . chiefly . . . flies," and the latter was unable to see any insects visiting the flowers, but "supposed" it was done by short-tongued bees, and "thinks" early-flying *Andrenæ* may be the instruments. Kirchner is a little more definite and mentions the honey-bee—as also does Bonnier—and the various species of flies named above. With regard to the honey-bee, it is obviously not the ordinary pollinator of those plants of *Viscum album* which flower in the early part of February, for only on exceptionally warm days is it on the wing at all in that month, and then not for working purposes. The *Andrenæ* mentioned by Loew hatch about the middle or even the latter end of March, and this appears to be the case with *Spilogaster* as well, so that these insects are not likely to have anything to do with mistletoe flowering in February. The *Pollenia* family hibernate, and individuals may come out on any really mild day in the winter, but they would not be about in sufficient numbers in the very early spring to fertilize the immense quantities of mistletoe one sees flowering in the Herefordshire orchards. Although I watched patiently and carefully over some very early flowering specimens of *Viscum* this spring (1916) for some considerable time, I could never detect any visiting insect,—the weather was much too cold,—yet at the date of writing (June 30th) the berries on the plants I watched are well set, and about a quarter of their future size. Some further investigation into the method by which the plant is fertilized seems to be necessary, particularly with regard to the earliest flowering plants.

III. PROPAGATION.

I was able to watch in February last, in the orchard previously mentioned, the manner in which the seeds of the mistletoe are distributed by the missel-thrush. There were great numbers of the birds present, and they were eating the ripe berries as fast as they could swallow them. The birds appeared to retain them but a very short time, as I was able to observe one bird continuously. The digested, or partly digested seeds, pass out first, followed immediately by the skins of the berries. The whole falls in a pile upon a bough, the skins forming a protecting cover for the seeds beneath. The gluten contained in the berry is only partly digested by the thrush, and a thick coating remains round each seed. This gluten has been changed by digestion, and is much more sticky than when in its natural state. After the rain has washed away the protecting layer of skins, it washes the seeds off the bough in a curious way. The seeds appear as if threaded on fine white thread, at about three-quarters of an inch apart, and these threads of seeds hang from the tree in lengths of from 12 to 18 inches. The wind blows them about, and the free ends very quickly catch up on to some other part of the tree, the gluten on the seeds holding them in place. I saw festoons of these seeds everywhere —there had been a fairly heavy rain the night before—but the wind blew these dangling threads in all directions, and it was difficult to get a satisfactory photograph. I think it not improbable that the seeds retain their positions on these threads, in the order in which the berries were first swallowed. I have noticed that the gluten in the berries when in their natural state dries up very quickly. If seeds are squeezed out and placed on a tree, by the next day the gluten, which has stuck the seed down firmly, has dried up and disappeared. The gluten on digested seeds remains soft and sticky for two or three days (and it may be longer), and the covering of skins is evidently intended to assist in preserving this moisture until the rain comes and helps in the distribution.

I have also proof that the *Viscum* seeds can lie dormant for some time, just as other seeds often do. A seed placed on the trunk of a copper-plum tree, at a spot where a small bough had been removed, and where the bark had grown over the place, leaving a mere dent in the centre, remained dormant for nearly three years. The two "seed" leaves then appeared, and although the plant looks quite healthy, its growth since then has been very slow. The wood must be "end grain" where it is growing, and the bark round it looks extremely hard.

THE VEGETATION OF HARPTREE COMBE.

By H. Stuart Thompson, F.L.S.

On July 15th, 1916, I visited Harptree Combe, N. Somerset; and was surprised to see so many flowering plants and ferns growing upon the stone retaining wall and massive pillars supporting huge water-pipes belonging to the Bristol Water Works Company, and built about seventy years ago. I made a somewhat hasty list of about 77 species upon the stonework.

The Combe, about a mile long, descends in a northerly direction from slopes of the Mendip plateau towards the beautiful Chew valley. It is less bare and rocky and otherwise different from most of the Mendip combes. Moreover a small stream, overgrown with vegetation, flows along the bottom. It is wooded on both sides, so that owing to the shade and moisture much *Cystopteris fragilis* grows both on the stonework and under the neighbouring trees and bushes, where the aqueduct crosses the valley. This fern is very rarely seen growing on the ground in woods. It is a less rigid form, as one would expect. Other ferns noticed on the stonework were *Scolopendrium*, *A. Trichomanes*, *A. Ruta-muraria* and one small plant of Bracken. There were several mosses and some *Marchantia.* The only grasses observed were *Arrhenatherum avenaceum* in quantity, *Melica nutans* L., *Avena pratensis*, *Holcus lanatus*, *Dactylis glomerata* and *Anthoxanthum odoratum.* There was a bush of *Rhamnus catharticus*, one of Hazel, and a small Beech and Ash. The most abundant large plant was *Eupatorium cannabinum*, with a fair quantity of *Campanula Trachelium* and a pale-leaved *Hieracium* not yet in flower. The list includes *Arabis hirsuta*, *Cardamine hirsuta*, *Lychnis dioica*, *Cerastium viscosum*, *C. triviale*, *Arenaria serpyllifolia*, *A. leptoclados*, *Hypericum hirsutum*, *H. perforatum*, *Linum catharticum*, several seedlings with one flower only, *Geranium molle*, *G. Robertianum*, *G. dissectum* and *G. columbinum*, *Oxalis Acetosella*, *Vicia sativa*, *Spiræa Ulmaria*, *Fragaria vesca*, *Rubus* sp., *R. idæus*, *Saxifraga tridactylites*, *Epilobium montanum*, *E. angustifolium*, *E. tetragonum* (very frequent in N. Somerset), *Angelica*, *Heracleum*, *Galium Mollugo*, *Bellis perennis*, *Chrysanthemum Leucanthemum*, *Achillea Millefolium*, *Lactuca muralis*, *Carduus acanthoides*, *Centaurea nigra*, *C. Scabiosa*, *Crepis virens*, *Hypochæris radicata*, *Leontodon hispidum*, *L. autumnale*, *Lapsana communis*, *Campanula rotundifolia*, *Myosotis collina*, dried up, Ivy, *Euphrasia* sp., *Scrophularia nodosa*, *Veronica Chamædrys*, *Calamintha Clinopodium*, *Nepeta Glechoma*, *Mentha* sp., *Thymus Serpyllum*, *Ajuga reptans*, *Brunella vulgaris*, *Lamium Galeobdolon*, *Rumex crispus*, *R. conglomeratus*, *R. Acetosa*, *Euphorbia amygdaloides*, *Mercurialis perennis*, *Urtica urens*. The only Sedge noticed was *Carex contigua* Hoppe, of which there are also several huge clumps 2 ft. 6 in. high in the brushwood near.

This list, which doubtless could be lengthened, is remarkable for the number of woodland and meadow plants growing upon the stonework; and for the apparent absence of any *Sedum*, of *Ceterach*, and *Parietaria ramiflora*, though the latter is somewhat local and usually prefers the vicinity of old houses.

Harptree Combe is one of the few places in Somerset where *Campanula patula* grows. It was comforting to hear a child say that her school-mistress had cautioned them against gathering this beautiful and increasingly rare plant. This was told me after I had failed to find it at Harptree. In the valley itself were handsome clumps of *Dipsacus pilosus* and the true *Carduus acanthoides* L., both seven feet high. *Listera ovata* was extremely fine; two specimens were more than two feet high with leaves six inches long. The inflorescence of Twayblade is most varied. Sometimes, especially in the Alps according to my observation, the lower lip is reflexed so as to touch the rachis; whereas in the two largest Harptree specimens the flowers are so spreading that the spike is 1½ in. wide, for some of the lower lips are at right angles to the main stem. A Twayblade gathered in June near Mells, Somerset, has three alternate leaves, two being very small.

Another rare and very beautiful plant (*Vicia Orobus*) was found near E. Harptree in 1888; and it grows in captivating clumps of white, mauve or purple, in several pasture fields—sometimes mown—a few miles away on the Mendip plateau. Both in England and on the Continent it happens to have a peculiar and somewhat similar distribution to *C. patula*. The centre of distribution seems to be neither N., S., E., nor W. Both plants are widely but sparingly spread over England and much of the Continent; and yet so local and uncertain are they that I have never seen either species between Norway and the Pyrenees; and *V. Orobus* in only three places in England and Wales. My friend C. E. Salmon saw it this year for the first time, in N. Wales. I never saw *C. patula* growing except in a roadside hedge in Worcestershire, in which county it is widely distributed, and once in Switzerland. The personal nature of these observations I make no apology for, because they all tend to show how strange and perplexing is the distribution of these two handsome plants. The Vetch is perennial, the Campanula usually biennial.

PSEUDOMUSSÆNDA: A NEW GENUS OF RUBIACEÆ.

By H. F. Wernham, D.Sc., F.L.S.

The Rubiaceous genus *Mussænda* gives its name to the tribe Mussændeæ, characterized by valvate æstivation of the corolla-lobes, and fleshy, indehiscent fruit containing many small angular seeds. Some species—particularly *M. frondosa*—are cultivated as ornamental plants for the sake of the flowers; for, in many of the latter, one calyx-segment is expanded into a broad, white or coloured, petaloid lamina, probably for the purpose of insect-attraction.

Now one species for some time regarded as a *Mussænda*, native in the Nile-land districts of Tropical Africa, and frequently cultivated elsewhere, bears a loculicidal capsule as its fruit. This is *M. luteola* Delile, described in his Cent. Pl. Afr. Cailliaud (1826), p. 65; but he makes no reference to the fruit. The same species had been described previously under the genera *Ophiorhiza* and *Manettia*: *O. lanceolata*, by Forskal, Fl. Ægypt-Arab (1775), 42, who describes the fruit as a bilocular capsule; and *M. lanceolata*, by Vahl, Symb. (1790), 12, who urges its inclusion in *Manettia* on the grounds of floral and fruiting characters.

The character of the fruit of this plant certainly suffices to remove it not only from the genus *Mussænda*, but also from the tribe *Mussændeæ*, in spite of its resemblance in habit to other species of that genus. The most striking feature of *Mussænda*, the petaloid enlargement of some of the calyx-lobes, is quite exceptional in the tribe; but it occurs not uncommonly among tropical American Cinchoneæ, Condamineæ, and Rondeletieæ. Indeed, all the critical characters of the plant in question—the valvate æstivation of the corolla, the capsular fruit with its numerous unwinged seeds—point unerringly to Condamineæ as the proper tribe for this so-called *Mussænda*, where it readily finds a place in the sub-tribe *Pinkneyeæ*. *Pinkneya* and *Pogonopus*, the present members of this sub-tribe, are confined to the New World; and our plant cannot be included in either of these, if only on account of the structure and position of the stamens, the anthers being almost sessile and set just below the mouth of the corolla.

Mr. Hiern (in Fl. Trop. Afr. iii, 71) refers to this plant as *Mussænda luteola* Del., and quotes as a synonym *Vignaudia luteola* Schweinf. in Schweinf. et Aschers. Enum. p. 282 (1867). This refers the plant in question—a *Mussænda luteola* Del.—to the genus *Vignaldia* of A. Richard, Tent. Fl. Abyss. i (1847), 357, which has since been shown coincident with *Pentas*. In any case *Vignaudia lutea* Schweinf. must be regarded as a *nomen nudum* in the absence of any description. To avoid further confusion in the matter, I propose a new name for the genus. This will include not only *M. luteola* Del., but two other species with capsular fruits previously described under *Mussænda*, as referred to below, and also a fourth species recently collected by Gossweiler and described here for the first time.

From close apparent resemblance to *Mussænda* I propose the generic name

Pseudomussænda,

RUBIACEARUM e tribu CONDAMINEARUM (§ *Pinkneyearum*) novum genus.

Calycis tubus turbinatus v. sub-oblongus; limbus 5-merus, quorum partum 4 angustissimi pro rata elongati, unus sæpius in laminam petaloideam productus. Corollæ tubus elongatus, gracilis intus in fauce necnon in ore villosissimus, lobi patuli lati, valvati. Stamina 5, antheris in corollæ fauce villoso subsessilibus. Ovarium 2-loculare; stylus gracilis ramis 2 linearibus; ovula numerosa. Capsula sæpius oblonga, 2-locularis, loculicide 2-valvis.

1. P. LANCEOLATA comb. nov. *Ophiorhiza lanceolata* Forsk. (*l.c. supra*). *Manettia lanceolata* Vahl. (*l. c. supra*). *Mussænda luteola* Del. (*l. c. supra*); Wernham, in Journ. Bot. li, 239. *Vignaudia luteola* Schweinf. (*l. c. supra*).

2. P. MONTEIROI nom. nov. *Mussænda Monteiroi* Wernham, in Journ. Bot. li, 240.

Angola: In rocky thickets, Anha-Benguella, *Gossweiler* 4273! Boma, *Monteiro*! but not *Gossweiler* 563! as in Journ. Bot. li, 240, for which see next species.

3. **P. Gossweileri** sp. nov.

Frutex gracilis, subglaber, *stipulis* parvis subsetaceis; *floribus* pro rata minusculis, *calycis* loborum aliis in laminam parvam petaloideam expansis, aliis filamentosis brevibus, in *capsula* parva mox deciduis.

Angola: Cazengo; Rio Catoco, Granja S. Luiz, n'Dalatando, October, 1914. *Gossweiler* 563! 6357!

This is a more delicate plant generally than the previous species. The branches are very straight, slender, and early invested with a greyish bark. The youngest are minutely pubescent, rather short, and bear the few-flowered corymbs terminally. The *leaves* are very thin, lanceolate to elliptical, acuminate with sub-acute apex, ± 7 cm. × 3 cm., and gradually narrowed at the base into the slender petiole, barely 1 cm. long; glabrous, except for scanty, minute hairs above, and minute spreading pubescence on the veins below. Lateral veins inconspicuous, 4 or 5 pairs only. *Stipules* very small, bifid into two curling setæ. *Corymbs* 4–5-flowered, glabrate. *Ovary* almost glabrous. *Calyx*-lobes, 2–2·5 mm. in the mature flower, setaceous, curling; one in many cases expanded into a narrowly ovate petaloid yellow lamina, 2 × 1·2 cm. or rather larger, acuminate below, gradually narrowed above into the subacute apex, very thin, glabrous. *Corolla* glabrous outside, except for a few scattered minute hairs; tube very slender, about 2·5 cm. long, inflated under the limb; the latter spreading, barely 1 cm. in diameter, lobes broadly ovate, ending in a setaceous mucro. *Capsules* barely 6 mm. long, oblong, calyx-lobes rapidly caducous.

Differs in many points from the Nile-land *P. luteola*; readily distinguished by the almost complete glabrousness, the small narrow petaloid calyx-lobes, and the small capsules, uncrowned by calyx segments.

4. P. CAPSULIFERA comb. nov. *M. capsulifera* Balf. fil. in Proc. Roy. Soc. Edin. xi, 836.

I append a key to these four species:—

- Ripe capsule at least 6 mm. long; petaloid calyx-lobe over 2 cm. long.
  - Petaloid calyx-lobe fairly tough, broadly ovate, elliptic or suborbicular, over 3 cm. long in flower.
    - Corolla-tube over 2·5 cm. long; fruiting calyx-lobes filamentous, 6 mm., persistent.. *lanceolata*
    - Corolla-tube not much over 1·5 cm.; fruiting calyx-lobes short, curled, early caducous .... *Monteiroi*
  - Petaloid calyx-lobe very thin, narrowly ovate, barely 2·5 cm. long in flower .... *Gossweileri*
- Ripe capsule barely 4 mm. long; largest calyx-lobes spathulate, less than 1 cm. (Socotra plant)... *capsulifera*

I take the present opportunity to describe a few new species of *Mussænda*, collected in Tropical Africa.

Mussænda entomophila sp. nov.

Frutex ramulis pilis rigidiusculis deflexis ferrugineis dense indutis. *Folia* elliptica, coriaceo-chartacea, ad ca. 11 cm. × 6 cm., brevissime acuminata acuta, basi subacuta, utrinque hispida, subtus discoloria, venis secundariis utrinque 9–10 tenuibus reticulo necnon interveniente conspicuis, *petiolo* validiusculo 1 cm. densissime rufo-piloso; *stipulæ* persistentes anguste lanceolatæ, longissime setaceo-acuminatæ bifidæ ± 1 cm. longæ. *Flores* in umbellis dense confertis. *Ovarium* parvum oblongum dense flavo-hispidulum; *calycis* lobi minores inæquales 5–10 mm. longi lineari-subulati, petaloidei maximi suborbiculares, acuti vix acuminati 10 cm. × 7·5 cm. vel majores, basi in petiolum hispidulum ± 2·5 cm. longum breviter acuminati. *Corollæ* extus dense flavo-hirsutæ tubus gracillimus 3 cm. excedens, limbus ± 7 mm diametro lobis setaceo-africulatis.

South Nigeria: Degema Division, *P. Amaury Talbot*!

Related to *M. tenuiflora* Benth., but readily distinguished by the much longer corolla-tube and relatively narrower limb.

Mussænda macrosiphon sp. nov.

Frutex ramulis ascendentibus virgatis densiuscule appresse rufo-pilosis. *Folia* ovato-elliptica, ± 13 cm. × 8 cm., breviter acuminata acuta, basi rotundata v. subcordata, utrinque papilloso-hispidula, subtus discoloria, venis secundariis conspicuis, utrinque 8–9, dense appresse rufo-pubescentibus; *stipulæ* mox deciduæ, verisimiliter parvæ triangulares. *Flores* aurantiaco-flavi, in corymbis 3–4-chotomis dispositi, pedunculis validiusculis ± 8 cm. longis. *Ovarium* anguste infundibulare densissime sericeo-pilosum 4 mm. longum; *calycis* lobi minores anguste lanceolati ovarium paullo excedentes, subæquales, petaloidei albi obovato-elliptici, 6–7 cm. × 4–4·5 cm. *Corollæ* extus appresse flavo-pilosæ tubus gracillimus 5 cm. longus, lobi ascendentes lanceolati acuminati acuti 6 mm. longi.

Portuguese Congo: Mayombe, here and there in cut-down forest, December 27th, 1914. *Gossweiler* 6046!

Another relation to *M. tenuiflora*; readily distinguished by the very long corolla-tube.

Mussænda Debeauxii sp. nov.

Ramula novella valde complanata breviter dense ferrugineo-pubescentes. *Folia* supra scabrida, basi truncata v. subcordata, venis secundariis utrinque 8–10. *Calycis* lobi petaloidei petiolo 2·5 mm. longo, minores inter breviores lanceolati acuti acuminati 3 mm. longi, conspicue ferruginei. *Corollæ* tubus breviter rufo-pubescens, infra medium gracillimus, insuper parum dilatatus, 4·3 cm. longus.

French Congo: Muni River, July, 1902, *Debeaux*!

Related to *M. angolensis*, but distinct in the longer corolla, scabrid leaves, and especially the ferruginous pubescence, which is particularly conspicuous in the inflorescence. The branchlets are fairly stout, with elliptical *leaves* about 13 cm. × 6·5 cm.; apex very shortly acuminate, acute; the veins and transverse reticulation are strongly-marked on the lower side; petioles nearly 2 cm. long; *stipules* triangular, acute-acuminate, 6 mm. long and 3 mm. wide at base. *Inflorescence* dense, bracts barely 5 mm. long, setose-acuminate. Petaloid lobe of *calyx* rather tough, densely hispidulous, obovate 4 cm. × 3·5 cm., with well-marked venation on the lower side, mucronate-acuminate, wedge-shaped at base. *Corolla*-limb over 1·2 cm. in diameter.

Mussænda Gossweileri sp. nov.

Frutex scandens, ramulis dense flavo-pubescentibus, tandem glabrescentibus, cortice fusco indutis. *Folia* anguste obovato-vel elliptico-oblonga, 7 cm. × 3 cm.—13 cm. × 4·7 cm., brevissime acuminata utrinque acuta, supra subscabridula subtus præsertim in venis pubescentia, venis secundariis utrinque 9–12, petiolo 7–15 mm. basin versus dilatato; *stipulæ* triangulares 6 mm. × 4 mm. acutæ. *Cymulæ* paucifloræ; flores subsessiles, ovario angustissime conico. *Calycis* lobi minores inter brevissimos anguste triangulares acuti acuminati ca. 2 mm. longi, petaloidei petiolo vix 1 cm. longo. *Corollæ* tubus extus breviter necnon

dense puberulus insuper subsericeus, limbus 12 mm. in diam. *Bacca* ellipsoidea puberula 1·8 cm. × 1·1 cm. calycis lobis deciduis nec coronata.

Angola: Kaconda, along the rivulet Cababa, February 27th, 1907, *Gossweiler* 4284!

A rare woody climber, attaining a height of 25 ft.; leaves soft and glossy above; petaloid calyx-lobes yellowish-white; corolla-tube greenish. Allied to *M. Afzelii*, but the corolla of our species is much more slender, and longer; also to *M. Isertiana*, but the last-named has much shorter and broader, obtuse calyx-lobes.

JOHN FLEMING, M.D. (1747–1829).

By James Britten, F.L.S.

In the course of revising our *Biographical Index of British and Irish Botanists*, the entry for Dr. John Fleming arrested our attention. The information regarding him given in our first edition is practically based entirely on Dr. Daydon Jackson's account in the *Dictionary of National Biography* (xix, 279), but a reference to the obituary notice in the *Gentleman's Magazine* (lxxxv, i, 568) from which that account is largely taken, contains no mention of Fleming's botanical attainments. Further investigation has shown that under the heading "John Fleming, botanist," two widely different persons are combined—one having a claim to that title, the other (who in Gent. Mag. is only designated "J.") a scholar who never published any work, but contributed largely on classical subjects to journals published in London. In order that the two men may be separated, I reprint the notice from D.N.B., placing in italics the portion which relates to the scholar:—

"Fleming, John (d. 1815), botanist, *was educated at Douai, took his degree of M.D. at Edinburgh, and* became president of the Bengal Medical Service. *He is stated to have been a good classic, and contributed to several journals, but* the only memoir of his which can be cited is his 'Catalogue of Indian Medicinal Plants and Drugs' in the eleventh volume of 'Asiatick Researches,' which was reprinted with additions, Calcutta, 1810, 8vo, and translated into Dutch and German. *He died of a paralytic stroke in London, 10 May, 1815.* Dr. Roxburgh dedicated the genus *Flemingia* to him, [and his name is further commemorated by the genus of fossil plants, *Flemingites*]."

"[*Gent. Mag. vol. lxxxv pt. i, p. 568*; Roxburgh's Corom. Pl. iii, 44]."

The sentence placed in brackets relates to yet a third person—John Fleming, D.D., of Edinburgh (1785–1857), in whose honour Mr. Carruthers, who had studied under him, named *Flemingites*.

For this composite paragraph the following account of John Fleming, M.D., condensed from Lieut.-Col. D. G. Crawford's

History of the Indian Medical Service, 1600–1913 (1914), may profitably be substituted:

"John Fleming was born in 1747, and entered the I.M.S. as Assistant Surgeon, Bengal, on 17th Aug., 1768, becoming Surgeon on 11th Dec., 1771, and, on the establishment of the Medical Board on 25th May, 1786, junior Member of the Board, instances of very rapid promotion. He became President of the Board on 8th Dec., 1800, and held that post, with an interval of furlough from 24th Dec., 1802 to 31st July, 1805, until 17th Dec., 1811, when he again took furlough to England. He retired on 10th Nov., 1813, after 45 years' service, for twenty-seven years of which he had been a Member of the Board. In 1818 he was elected M.P. for Gatton, a pocket borough disfranchised in 1832, but only retained his seat for two years, till 1820, when he did not stand again. He died in London on 17th May, 1829." (ii, 161.)

It may be worth while to bring together the scanty details which I have been able to find relating to the scientific attainments of the author of the *Catalogue of Indian Medicinal Plants*. It is scarcely accurate to describe him as if he were only interested in plants, as a letter addressed from Calcutta, November 11th, 1797, to Sir Joseph Banks relates to "a Thibet Musk," of which he was sending a living specimen: in this he describes himself as "a lover of Natural History." The *Catalogue*, as already stated, is dated from Calcutta, 1810 (*Asiatick Researches*, xi, 153–196); the re-issue (same date and place) was "printed separate (with emendations and some additions) for the convenience of those for whose use chiefly it was compiled"; it is an octavo volume of 72 pages, and has an index and an appendix relating to "the efficacy of the bark of the root of the Pomegranate tree as a remedy for the tape-worm."

In India Fleming was a friend of Francis Buchanan (afterwards Hamilton: 1762–1829) and Thomas Hardwicke (1757–1835). The former writes of him to Smith, March 3rd, 1802, as "my good friend Mr. Fleming, a very great encourager and promotor of natural history: you will find him a frank, pleasant, and learned man, with a greater knowledge of man and manners than usual. At a later date (November 4th, 1807) Hardwicke writes from Calcutta: "Mr. Fleming and myself have often indulged in conversation about you: he has a great desire to be better known to you, but how soon he may have that opportunity I am not in a position to say. He is here in the full enjoyment of health and all the ease and luxury a man can wish for; consequently he is very indifferent about leaving the country" (*Correspondence of J. E. Smith*, ii, 88, 120).

On his return to England, Fleming settled in London: a memorandum in the autograph collection of the Department of Botany, relating to the collection of drawings hereinafter mentioned, is dated from Chandos Street, Grosvenor Square, Sept. 24, 1812; he was elected a Fellow of the Royal Society in 1813, and of the Linnean Society on January 16th, 1816, at which time he was residing at Gloucester Place. Fleming was also a Fellow of the Royal Society of Edinburgh and of the Horticultural Society, and a member of the Asiatick Society.

Fleming, "whose knowledge of the science of Botany justly demands this tribute," is commemorated by Roxburgh in the genus *Flemingia*, published in his *Plants of Coromandel*, iii, 44 (1819). It would appear from Wallich's *List* (nn. 4361, 4364) that Roxburgh had in his herbarium given the name to *Canscora diffusa*. The publication of the genus, however, dates from Aiton's Hort. Kew. ed. 2, iv, 349 (1812), where it stands as "*Flemingia*. Roxb. Corom. 3," and is followed by the description of six species, five of which are similarly referred. Only two of these, however, were actually described in the *Plants of Coromandel*. and there with English descriptions only, the diagnoses in Hort Kew. being in Latin: all are in *Flora Indica* iii, 337–342. The genus does not appear in the Solander MSS. on which Hort. Kew. is so largely based; it seems likely that the descriptions were supplied from Roxburgh's MSS. by Robert Brown, who was largely responsible for the *Leguminosæ* in the second edition of that work.* It may be noted that one of the species (*l. c.* 338) is described as "*F. prostrata* Roxb. Jun.": this seems to indicate that it was added by James Roxburgh, who wrote the preface to the volume, though I was not previously aware that either he or his brother John, who may possibly be intended, had published species.

Roxburgh was intimately acquainted with Fleming, as is shown by the memorandum already quoted, which I think bears some relation to the large collection of Indian drawings formed by the latter. This collection is now incorporated in the arranged series of plates in the Department of Botany, by which it was purchased in 1882: it was then in thirteen folio volumes. The drawings are mainly by native artists and include copies of many of the plates in the *Plants of Coromandel*, which were probably made from the originals for that work.† They are named by Fleming, sometimes on the back; localities are sometimes added taken apparently from published descriptions. I find in my notes a statement that Fleming collected in the Punjaub which is probably correct, though I cannot find a reference for it: apart from this I have no knowledge of him as a collector.

BOTANICAL RESEARCH.

Dr. Rendle's Presidential Address to the Botanical Section of the British Association at Newcastle was mainly occupied with considerations as to the course of action to be taken after the war. He pleaded for the closer relation of botany with agriculture and horticulture in the observation and study of plant diseases: "The anatomical and chemical study of timbers might with advantage occupy a greater number of workers." He insisted specially on the need for a more systematic exploration of our colonies, which has hitherto been left largely to amateur collectors, contrasting this with the work of the Germans in East Africa and the Belgians on the Congo, as illustrated by the important memoirs which have been issued by the German and Belgian Governments.

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* See "History of Aiton's 'Hortus Kewensis'" (Journ. Bot. 1912, Supp. iii, p. 7).

† On this point reference may be made to my paper on Hardwicke's Botanical Drawings in Journ. Bot. 1906, 238, whence some of the above information is taken.

"It is time," Dr. Rendle continues, "that pioneer work gave place to systematic botanical exploration of our tropical possessions and the preparation of handy working floras and economic handbooks. Work of botanical exploration should be full of interest to the young botanist. But if he is to make the best use of time and opportunity he must have had a proper course of training. After completing his general botanical course, which should naturally include an introduction to the principles of classification, he should work for a time in a large Herbarium and thus acquire a knowledge of the details of systematic work and also of the general outlines of the flora of the area which he is to visit later. He should then be given a definite piece of work in the botanical survey of the area. From the collated results of such work convenient handbooks on the botanical resources of regions open to British enterprise could be compiled. There will be plenty of work for the systematist who cannot leave home. The ultimate elaboration of the floristic work must be done in the Herbarium with its associated library. There is also need of a careful monographic study of genera of economic value, which would be best done by the experienced systematist at home, given a plentiful supply of carefully collected and annotated material. . . . Closely allied species or varieties of one and the same species may differ greatly in economic value, and the work of the monographer is to discover and diagnose these different forms and elucidate them for the benefit of the worker in the field."

Dr. Rendle then proceeds to insist very strongly that "botanical research stations in different parts of the Empire, adequately equipped and under the charge of a capable trained botanist, are a prime necessity. We seem to have been singularly unfortunate, not to say stupid, in the management of some of our tropical stations and botanical establishments. . . . A botanical station for research to be effective must be under the supervision of a well-trained botanist with administrative capacity, who must have at his disposal a well-equipped laboratory and ground for experimental work. He must not be expected to make his station pay its way by selling produce or distributing seedlings and the like; a botanical station is not a market-garden. The Director will be ready to give help and advice on questions of a botanical nature arising locally, and he will be on the look-out for local problems which may afford items of botanical research to visiting students. Means must be adopted to attract the research student, aided, if necessary, by research scholarships from home. The station should have sufficient Imperial support to avoid the hampering of its utility by local prejudice or ignorance. The permanent staff should include a mycologist and a skilled gardener. The botanical station does not preclude the separate existence of an agricultural station, but the scope of each must be clearly defined, and under normal conditions the two would be mutually helpful. Nor should the botanical station be responsible for work of forestry, though forestry may supply problems of interest and importance for its consideration."

In conclusion, Dr. Rendle suggests "the holding of an Imperial Botanical Congress at which matters of general and special interest might be discussed. The visit of the British Association to Australia was, I think, helpful to the Australian botanists; it was certainly very helpful and of the greatest interest to those coming from home. Many of the addresses and papers were of considerable interest and value, but of greater value was the opportunity of meeting with one's fellow-workers in different fields, of conversation, discussion, and interchange of ideas, the better realisation of one's limited outlook, and the stimulus of new associations. A meeting which brought together home botanists and botanical representatives from oversea portions of our Empire to discuss methods of better utilising our vast resources would be of great interest and supremely helpful. Let us transfer to peace purposes some of the magnificent enthusiasm which has flowed homewards for the defence of the Empire in war."

REPORT OF DEPT. OF BOTANY, BRITISH MUSEUM, FOR 1915.

By A. B. Rendle, D.Sc., F.R.S.

Acquisitions.

(1) *By Donation.*

The following are the more important additions to the British Herbarium:—Flowering Plants; 85 specimens from C. E. Britton, Esq.; 124 specimens from Rev. E. S. Marshall; 54 specimens from C. E. Salmon, Esq.; and 49 specimens from the Watson Botanical Exchange Club. A large collection of Seaweeds, Mosses, and Lichens by the late E. George, from the London County Council.

The following are the more important additions to the General Herbarium:—B. Digby, Esq., 92 Siberian plants; Mrs. M. E. Prescott-Decie, 413 specimens from Northern India; H. N. Ridley, Esq., C.M.G., 943 Selangor plants; Dr. E. Hartert, 50 Sahara plants; A. E. Kitson, Esq., 19 West African plants; P. Amaury Talbot, Esq., 82 specimens from Degema, Southern Nigeria; T. F. Cheeseman, Esq., 33 New Zealand plants; Dr. R. S. Rogers, 82 Australian Orchids; Dr. F. Stoward, 89 West Australian plants; A. H. Lyell, Esq., 139 North American plants.

The late J. A. Tulk's collection of Diatoms, comprising 2665 slides, from the Committee of Middlesex Hospital.

(2) *By Purchase.*

The following are the more important additions: The Botanical Exchange Club, 419 British Flowering plants; U. Faurie, 1800 Formosa plants; R. A. Dümmer, 800 plants from Uganda and British East Africa; and Miss A. Pegler, 50 Fungi from Kentani, South Africa. Continuations of published sets of European plants—from H. Dahlstedt, 55 specimens; H. Sudre, 100 specimens; and of North American Algæ by Collins, Holden and Setchell, 100 specimens.

(3) *By Exchange of Duplicates.*

The Regius Keeper, Royal Botanic Gardens, Edinburgh, 2401 plants from China, Tibet and India; Director, South African Museum, Cape Town, 100 Basutoland plants; Director, National Herbarium, Sydney, 101 Australian plants; Curator, National Museum, Melbourne, 28 Australian plants; Botanist, Bureau of Science, Manila, 1643 Philippine plants; Director, Museu Goeldi, Para, Brazil, 94 Brazilian plants; California Academy of Sciences, San Francisco, 165 North American plants.

SHORT NOTES.

Potamogeton alpinus Balb. × lucens L.—Mr. Green of Swanage has sent me specimens from Bindon Mill-dam near Wool, Dorset, and from the river Frome above Wareham, which can only be referred to the above hybrid. The finder remarks they both grow with *perfoliatus* L., but the leaf-bases will not allow of that species being one of the parents. I have nothing like these specimens from England before. But we are faced with a difficulty. Ascherson & Graebner, in the second edition of their Syn. Mitteleurop. Flora (Potamogeton, p. 501 (1913)), doubtfully refer *P. salicifolius* Wolfg. to this hybrid: in this Journal for 1908 (p. 251) I expressed the same opinion, and Mr. Fryer in his MSS. seems to have come to a similar conclusion. But the leaf-bases in Wolfgang's own specimens, and also in Besser's, are semi-clasping, thus indicating that some other species, such as *perfoliatus* or *prælongus*, has to do with it. At present the matter may rest here, though I am coming somewhat to Dr. Hagström's view, that here we have a series of hybrids that eventually must come under *P. decipiens* Nolte as an aggregate; indeed, I put *salicifolius* under *decipiens* in the last edition of the London Catalogue. Omitting discussion as to this, the specimens from Mr. Green are *alpinus* × *lucens*. I have two other interesting forms of the genus under consideration on which I hope to report later.—A. Bennett.

Sieglingia (Triodia) decumbens in Marshy Ground.—The habitat of this grass given in most of the British 'floras' is such that it would appear confined to "dry mountain pastures, heaths and moors" (Hooker & Arnott); "dry pastures and moors" (J. D. Hooker); "dry places and heaths" (Babington); "dry heaths and hilly pastures" (Bentham); "barren pastures" (Wood's *Tourist's Flora*). Smith in *English Botany*, ed. 2, says "spongy bogs on sandy mountainous ground"; and in the *Botany of Worcestershire* (1909) the word bogs is given with heaths and heathy pastures; but even that most accurate observer Mr. J. W. White says, in his *Flora of Bristol*, merely "downs, heaths and dry hills; rather rare." On August 4th I came across many fine specimens of this grass, some were more than two feet high, in a marshy meadow of mowing grass, on the peat moor between Portishead and Clevedon; and earlier in the season I saw smaller examples on the central Somerset peat moor near Ashcot. The former were so tall, and with so many more spikelets than usual (frequently 8–11) that, until I noticed the ligule composed of a tuft of hairs, the grass puzzled me, and hence a series of specimens was gathered. Except in size and the more numerous spikelets and branched panicles the plants seem normal. On the Continent the secondary habitat, viz. marshy, not boggy, ground, seems to have been noticed more. For example, Coste (*Flore de la France*) says, "Landes et pâturages siliceux humides"; Schinz & Keller (*Flore de la Suisse*) say, "Bords des bois, près maigres, pâturages et prairies *marécageuses*; surtout dans la région montagneuse sur terrains pauvres en calcaire." Koch (*Synopsis*, ed. 2, 1844) merely says, "In pratis, pascuis, ericetis, sylvarum locis denudatis."—H. S. THOMPSON.

CAREX RARIFLORA (pp. 145, 211).—Mr. L. Cumming has sent me his specimen, gathered on Ben Lawers in August, 1899, for examination. It is in good fruit, and is thoroughly typical *C. rariflora* (not, as I suggested, *C. atrofusca*).—EDWARD S. MARSHALL.

JUNCUS TENUIS IN KERRY.—I found this plant in small quantity by the road side at Parknasilla, Co. Kerry, in August last. —JAMES BRITTEN.

REVIEWS.

Report on the Botany of the Wollaston Expedition to Dutch New New Guinea, 1912–13, by Mr. H. N. Ridley, C.M.G., assisted by Messrs. E. G. Baker, S. Moore, H. F. Wernham, C. H. Wright, and others. With an Introduction by Mr. C. Boden Kloss, Assistant Director of the Museum at Kuala Lumpur, Federated Malay States.

THIS valuable contribution to our knowledge of the flora of New Guinea was issued in August as the first part of Volume IX of the Transactions (Botany) of the Linnean Society, and contains an account of the collection of plants made during the expedition conducted by Mr. A. F. R. Wollaston. The collection is exceedingly rich in novelties; upwards of 500 new species are described, and 11 new genera—*Papuzilla* Ridl. (Cruciferæ); *Pocillaria* Ridl., *Leucocorema* Ridl., and *Pentastira* Ridl. (Icacineæ); *Pyrsonota* Ridl. (Saxifragaceæ); *Cremnobates* Ridl. (Legnotideæ); *Mischopleura* Wernh. (Ericaceæ Rhodoreæ); *Neowollastonia* Wernh. (Apocynaceæ Plumerieæ); *Thylacophora* Ridl., *Eriolopha* Ridl., and *Psychanthus* Ridl. (Scitamineæ). Among the genera most largely represented are *Drimys* (of which New Guinea appears to be the headquarters) with 8 new species, *Eugenia* with 16, *Medinilla* (10), *Begonia* (7), *Vaccinium* (10), *Rhododendron* (17), *Dendrobium* (26), *Bulbophyllum* (27), *Phreatia* (12). The new genus *Eriolopha* contains plants referred by authors to *Alpinia*, which are indicated as belonging to it but not named under it, as Mr. Ridley has seen none of them and hence avoids making new combinations: ten new species are described: he observes a similar wise reticence under *Psychanthus*, under which he places certain other plants previously assigned to *Alpinia*.

It is we think to be regretted that new genera were not selected for figuring on the plates accompanying the memoir, in preference to new species of such well-known genera as *Saurauia*, *Medinilla*, and *Pilea*: only three of these—*Papuzilla*, *Pyrsonota*, and *Thylacophora*—are represented. The plates indeed are open to criticism on other grounds: that they are reproduced by some process is only too intelligible in these days of stress; but the general flatness of the figures reminds one of the productions of Indian artists, and their arrangement might have been improved. As they stand, the dissections and whole figure of a species sometimes appear on separate plates—an inconvenience which might surely have been avoided, and which is accentuated by the arrangement of the "explanation of the plates": a reference to that of plates 3, 4, and 6 will illustrate our meaning. The plates, instead of bearing as they should do the names of the plants figured upon them, are all lettered "Plants from Dutch New Guinea"—which in the case of t. 5, representing only one species, is not even literally accurate—thus necessitating constant reference to the "explanation."

By a curious—and, for those who may wish to consult the types, a serious—omission, it is nowhere stated where the specimens are preserved: we understand that these are in the National Herbarium. It will have been noted that the officers of the Department of Botany have taken a considerable share in the working-out of the plants.

Botanists who use the *Report* must be careful not to overlook the "corrections and additions" which appear on its last page. In these are supplied the references to plates, which are omitted from the text, as well as to the earlier publication of two of the new genera and nine of the new species in *Hooker's Icones Plantarum*, vol. i, part 3, which appeared in June, thus antedating the *Report* by about two months. In the *Icones* these are referred to "Trans. Linn. Soc. ser. 2, ix, ined": it is surprising that an analagous correlation was not supplied in the *Report*; this could quite easily have been done, as Mr. Ridley is responsible both for this and for the descriptions in the *Icones*, to which his name is indeed appended, and the two publications were passing through the press simultaneously.

The difficulties presented by this dual publication are more serious than might at first sight be perceived. Two of the new genera and five of the new species are attributed in the corrections to "Wernham in Hook. Ic. Pl."; but a reference to the *Icones* fails to justify such an attribution. We are in a position to state that Mr. Wernham was in no sense responsible for the descriptions in the *Icones*; not only does his name appear nowhere in connection with them, but they were not even submitted to him in proof, and, as has been said, Mr. Ridley's name alone is appended to them. Had Mr. Ridley printed, as we think he should have done, the author's own descriptions of the plants, which he manifestly had before him when preparing the text for the *Icones*, there would be less ground for criticism; but he modifies these descriptions by trivial alterations of phrasing, by omission of details, and in at least one case—there may be others, but the instance to be cited is the only one we have checked—by direct contradiction: the new genus *Neowollastonia* is described by Mr. Wernham (*Report*, p. 110) as having "calyx glandulosus," whereas Mr. Ridley (Ic. Pl. 3060) writes "calyx *e*glandulosus." This may have been a slip of the pen, as we find in the same description "stamina infra tub*um* medium inserta," but, occurring as it does in the first published account of the genus, is not without importance. It is perhaps somewhat of an assumption that Mr. Ridley is the writer of the generic description, as his name is appended only to that of the species; but we do not think there are any grounds for attributing it to Sir David Prain, the editor of the *Icones*, and it certainly did not proceed from Mr. Wernham's pen.

These things being so, the "corrections" on p. 269 of the *Report* must be further corrected by the addition of the words "ex Ridley" after the names of Messrs. Wernham and Moore, whose own publication of the species was anticipated by Mr. Ridley. It may be well to subjoin a list of the plants which appear both in the *Icones* and in the *Report*, with completed references and an indication of the way in which they will have to be cited by future writers:

Drimys elongata Ridley in Hook. Ic. Pl. 3051; in Trans. Linn. Soc. ser. 2, ix, p. 13.

Aglaia rubra Ridley in Hook. Ic. Pl. 3052; in Trans. Linn. Soc. vol. cit. p. 26.

Timonius vaccinioides Wernham ex Ridley in Ic. Pl. 3054; in Trans. Linn. Soc. vol. cit. p. 74.

Vittadinia disticha S. Moore ex Ridley in Ic. Pl. 3055; in Trans. Linn. Soc. vol. cit. p. 84.

Mischopleura Wernham ex Ridley in Ic. Pl. 3059; in Trans. Linn. Soc. vol. cit. p. 99. *M. ovalifolia* et *M. Ridleyana* Wernham ll. cc.

Neowollastonia Wernham ex Ridley in Ic. Pl. 3068; in Trans. Linn. Soc. vol. cit. p. 110; *N. tabernæmontanoides* Wernham, ll. cc.

Solanum peranomalum Wernham ex Ridley in Ic. Pl. 3062; in Trans. Linn. Soc. vol. cit. p. 119.

Eriolopha Ridley in Ic. Pl. 3067; in Trans. Linn. Soc. vol. cit. p. 217: *E. flagellaris* Ridley ll. cc. (219).

Standard Cyclopedia of Horticulture. Edited by L. H. Bailey. Vol. iii, F—K, pp. 1201–1760; Figs. 1471–2047; 21 full-page plates, 4 coloured. Vol. iv, L—O, pp. 1761–2422; Figs. 2048–2693; 20 full-page plates, 4 coloured. New York: Macmillan & Co. Price of each, 25*s.* net.

These volumes fully maintain the high standard set by the previous instalments, of which some notice appeared in this Journal for 1914 (p. 252) and 1915 (p. 72). Of especial interest in vol. iii is the long article on Horticulture. This contains amongst other matters an account of the early history of American gardening; the native species of fruits and vegetables; early general writings; fruit growing with especial reference to the apple; with 160 short biographies of prominent deceased horticulturists who were in any way connected with America—*e. g.* William Cobbett, of *Rural Rides* fame, who fled to Philadelphia when he was in danger of arrest through the publication of *The Soldiers' Friend*;—and a very extended list of works dealing with American horticulture, which includes the publications of the many present and past horticultural societies. The principal genus included in this volume is *Iris*, contributed by H. Hasselbring. The systematic portion treats fully of 109 species with their varieties, and other names are accounted for in small type. Full use has been made of Mr. J. G. Baker's monograph, Mr. R. I. Lynch's book, and the important monograph by Mr. W. R. Dykes noticed at length in this Journal for 1913. A key is given to the sub-genera *Evansia, Pogoniris, Pseudoregelia, Regelia, Oncocyclus, Pardanthopsis, Apogon, Juno, Xiphium*, and *Gynandriris.* In the descriptions the essential characters of the species are given, special stress being laid on the points which the grower would consider of importance.

Mr. J. H. Tilton's article on *Lilium*, in the fourth volume, may be taken as a fair representative of the manner in which a large genus is treated. A short account of the genus and the distinguishing characters of the sub-genera—*Eulirion, Isolirion, Cardiocrinum, Archelirion, Martagon, Pseudomartagon*, and *Notholirion* —are followed by a general account of cultivation (soils and location, protection from cold and wind, propagation, and insect pests and fungoid diseases). The American florist lily trade is described and the species especially suitable for forcing are enumerated. The species which are cultivated in America are described and an alphabetical list of these is given. The description of the species is short but ample. Full synonymy is included, and references to figures (often with criticisms) and botanical and horticultural literature. Varieties and hybrids are treated, and useful critical information is given regarding the origin of horticulturists' varieties. The geographical distribution also receives attention, and floricultural hints and the time of flowering are usually appended. In smaller type over thirty other species are briefly described. The authorities for the species are given, a point which is often neglected in horticultural works; a reference to the original description of the species would have been a useful addition.

J. K. Ramsbottom.

BOOK-NOTES, NEWS, ETC.

The July number of *Oldfeld Past and Present*—the magazine of the Friends' School near Swanage—contains an account of the efforts there made to co-operate with the Herb-Growing Association in utilising the vegetable resources of the country. At the suggestion of Prof. Oliver, *Spartina Townsendii* has been collected with a view to experiments being made upon it by paper manufacturers, who may possibly find it an efficient substitute for esparto-grass. The Report, however, shows the importance of knowing beforehand what is required; "So far our attempts to help have ended in complete failure with the exception of one item—elder-flower." The account of wholesale and useless destruction of Henbane is rather sad reading, and suggests that it may be necessary to take steps to prevent the extermination of British plants of economic value: "We made an excursion to Chapman's Pool to gather henbane. We brought some 60 lbs. back, but found when submitted to the authorities that it was out of season and quite useless. We gathered the whole plant and did not dry it. We have found since that all that is wanted is the leaves dried. However, we hope to be able to gather the seed and prevent its absolute destruction on the ground where it grows, much to the chagrin of the farmer who owns the land."

We are sure that all those who obtain so much enjoyment from rambles in the country, and who admire the ferns, primroses and violets growing in their natural surroundings will agree that strong measures should be taken to stop the trade carried on by those who merely go out to collect them for sale. In order to check the practice, two of the horticultural journals—*The Gardeners' Magazine* and *Amateur Gardening*—have decided not to accept in future advertisements inviting orders by post for ferns and other wild plants, excepting from those who cultivate them for commerce. It is suggested that local authorities should obtain powers, if they do not already possess them, to prosecute offenders, and thus preserve one of the most attractive features of the countryside.

The *Proceedings of the Royal Society* contains a preliminary report by Messrs. Clement Reid and James Groves on the fossil

Characeæ of the Purbeck beds which formed the subject of an exhibition at the Linnean Society on June 1st, and of which some account was given in our July issue (p. 213). The paper contains a detailed description of the genus *Clavator*, with an accompanying plate (from photographs) showing details of structure.

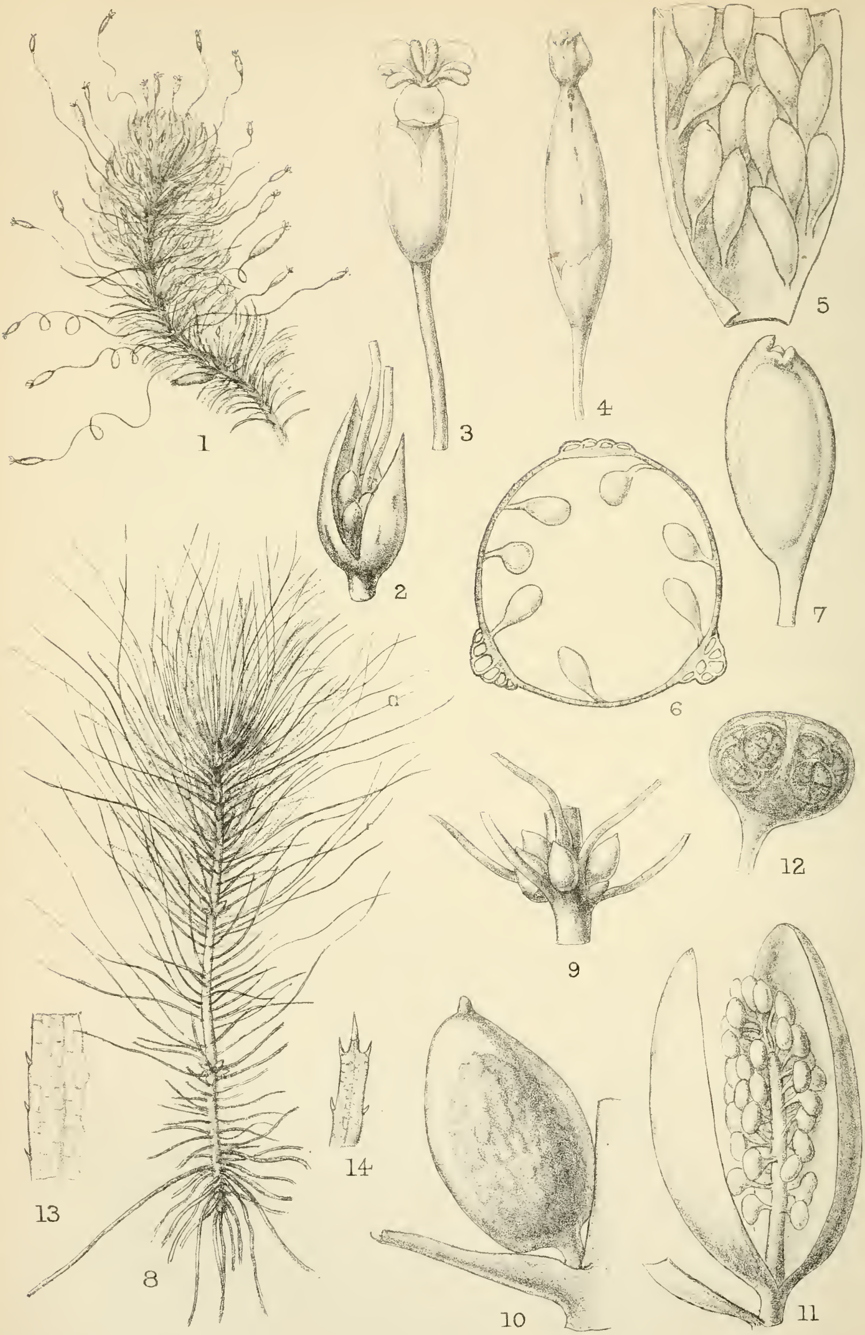
The third and concluding part of the *Flora of Aden*, by the Rev. Ethelbert Blatter, S.J., F.L.S., completing the seventh volume of the Records of the Botanical Survey of India, has recently been published. The two preceding instalments were noticed in this Journal (1914, 255; 1915, 376) on their appearance; the present concludes the enumeration of the phanerogams; the cryptogams are represented by one Fungus and five Lichens. A full bibliography is appended and there is a full index.

In addition to the Dutch New Guinea plants enumerated on p. 308, the part of *Hooker's Icones Plantarum* issued in June contains many plants of special interest. Dr. Stapf describes three new genera of grasses; two of *Paniceæ*—*Chloachne* from West Tropical Africa, and *Uranthœcium* (based on *Rottbœllia truncata* Maiden & Betche) from New South Wales—and *Danthoniopsis* (*Arundinelleæ*) from West Tropical Africa. He also contributes a monograph of the Madagascar genus *Pœcilostachys*, of which five species are enumerated.

The latest issue of the *Journal of the Linnean Society* (Botany, xliii, no. 291) contains a paper on "The Structure and History of Plav, the Floating Fen of the Delta of the Danube," by Marietta Pallis, with fifteen plates; and "On a Collection of Bornean Mosses made by the Rev. C. H. Binstead," by Mr. H. N. Dixon, with two plates. In the latter many new species are described.

The centenary of the establishment of the Sydney Botanic Gardens was celebrated by a public meeting at the Gardens, at which Mr. Grahame, the Minister for Agriculture, presided, and the Governor, Sir Gerald Strickland, was present. Mr. Maiden, Curator of the Gardens, delivered an address in which he briefly sketched their history, and at the conclusion of the proceedings Mr. Grahame laid the foundation of the new herbarium and museum.

The latest issue (dated August 15th) of the *Contributions from the Gray Herbarium of Harvard University* is entirely devoted to Mr. J. Francis Macbride's work upon *Borraginaceæ*. It contains three papers: "The True Mertensias of North America," of which 32 species, four of them new, and many new varieties, are described; "Revision of the genus *Oreocarya*," with 45 species, three new; and "Notes on certain *Borraginaceæ*," with a new genus, *Amblynotopsis*, based on plants previously referred to *Krynitzkia*, numerous new species of *Cryptantha*, Mertensias from China and Japan, and a New Zealand *Myosotis*. A clavis is supplied for the species of *Mertensia* and *Oreocarya*. It is evidently an important contribution to our knowledge of the order.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Adlard & West Newman, imp.

Maidenia rubra Rendle,

MAIDENIA:

A New Genus of Hydrocharidaceæ.

By A. B. Rendle, D.Sc., F.R.S.

(Plate 545.)

The Director of the Sydney Botanic Garden has recently sent me a few specimens of a small submerged water-plant collected in 1906 near the King River, East Kimberley district, North-West Australia, by Mr. W. V. Fitzgerald, who recognized the plant as a new genus, and whose name I have adopted.

The specimens represent a delicate plant 2 to 2½ inches high with the habit of the African *Lagarosiphon.* The slender erect simple stem is attached at the base by a dense cluster of thread-like roots. Its internal structure resembles that of other submerged aquatic Monocotyledons of similar habit. The sharply delineated central stele consists, as seen in transverse section, of densely packed small-celled fibrous tissue surrounding a central air-space and an irregular ring of somewhat smaller more peripheral air-spaces. Round the outside of the stele are generally two layers of parenchyma, and the rest of the section is occupied by the cortex, consisting of a very open network of air-spaces separated by single layers of parenchyma; this extends to the epidermal layer. Through the cortex a thin strand of the elongated fibrous cells, surrounded by a definite one-layered sheath of parenchyma, runs out to the base of each leaf, up the centre of which it is continued as a not very conspicuous midrib.

The stem is covered from base to apex with numerous almost thread-like leaves, one at each node, but with internodes almost entirely suppressed. The leaf-base broadens somewhat to the insertion, but there is no definite sheath and no stipular structure. The leaf is flat and narrow-linear, tapering above to a point; along the margin at intervals about equal to or exceeding the width of the leaf are small upwardly pointing spine-cells which protrude on a shallowly triangular base; the leaf-apex ends in one or a pair of similar spines. The internal structure is very simple; on either side the narrow midrib are air-spaces beyond which the lamina is only two cell-layers in thickness. The inflorescences are of a very reduced type. In the male plant they are grouped at intervals on the stem; several (3–5) spathes in successive grades of development arise in the axil of each of two leaves which are almost opposite, forming together an apparent whorl of spathes—a kind of verticillaster; associated with each spathe is a minute hair-like structure. The spathes in each leaf-axil probably represent a unilateral cyme; in addition to these the same leaf-axil shelters a pair of opposite sheathing bracts of different ages, each of which envelops a very young group of spathes. This arrangement, which is made out with some difficulty from the very meagre dried material, suggests a flowering period which is continuous so long as the conditions are favourable or the life of the plant allows. The older spathes are easily opened; the two valves are distinct to the base and protect the rather stout central axis, which is densely covered with a grape-like mass of stamens, each with a short filament and a horizontally somewhat elongated anther. The arrangement of the stamens is presumably racemose, but development is apparently rapid, and in the most advanced spathes, which are very easily detached, the condition of the anthers is very uniform. Under high magnification the anthers are seen to be two-celled and to contain pollen-mother-cells which are dividing crosswise into four (fig. 12). No later stage was found, and it may be assumed that the spathe with its short stalk is released and floats to the surface of the water. The broad concave spathe-valves may then spread and form floats for the central staminiferous axis, facilitating its passage to the emerging female flower, and recalling the method of pollination in *Vallisneria*.

The arrangement of the female spathes is somewhat similar. In the axils of generally three leaves, which are almost at the same level, are developed sessile leaf- and flower-bearing shoots, which together form an apparent whorl at intervals along the length of the stem and become closely crowded towards its apex. The leaf subtending the reduced whorl has a broader base; the axillary shoot bears at its base several long narrow foliage-leaves, immediately above which the axis bears in succession a number of broadish sheaths, each of which envelops a foliage-leaf and a flower. This arrangement is best seen in the young shoots at the apex of the stem, in each of which an indefinite succession of flowers is indicated. It suggests, as in the male plant, an indefinitely prolonged flowering period. Around the base of each flower are several hair-like structures similar to those found associated with the male flowers. When mature the spathe is carried to the surface of the water by the lengthening of the peduncle, which is many times its length, and the flower expands at the surface. The three broad red-purple spreading petals alternate with three deeply bifid spreading stigmas; there is no trace of a second whorl of perianth-leaves or of staminodes. In section the ovary is slightly three-sided, a character which becomes exaggerated after pollination, and is due to the development of three low longitudinal ridges (fig. 6). The ovary walls are covered internally with upwardly directed short-stalked ovules, each of which has a single integument. The developing fruit bears the withering perianth at the apex and is invested below by the remains of the spathe; in this condition it is withdrawn below the surface of the water by spiral contraction of the peduncle. Ripe fruit was not found. A slight difference in the width of the three sides of the fruit, one being larger than the other two, associated with a slight inequality of the perianth-segments which was observed in one or more of the flowers examined, indicates a tendency to zygomorphy.

The affinity of this interesting little plant is obviously with *Vallisneria*, though the habit strongly recalls the African genus *Lagarosiphon*. *Vallisneria caulescens* Bailey & F. v. Muell., from

Queensland, differs from the typical species of the genus in having an elongated leafy stem with the habit of a *Potamogeton* but quite unlike that of *Maidenia.*

One of the specimens of *Maidenia* bears the remains of a stolon springing from the base of the stem; this indicates a method of propagation comparable with that of *Vallisneria spiralis*. The presence of more than one flower in the leaf-axil in the female plant of *Vallisneria* also suggests a comparison with the complicated and much reduced leaf- and flower-bearing axillary shoots in *Maidenia.*

The floral structure is that of *Vallisneria* but greatly reduced. The typical floral plan of the family Hydrocharidaceæ is trimerous; the perianth consisting of two alternating whorls, the relative size and importance of which varies in different genera. In *Lagarosiphon* the inner and outer whorls are very similar, but in *Vallisneria* the members of the inner are reduced in the female flower to inconspicuous scales, while in *Maidenia* the reduction is carried further and there is no external trace of an inner whorl. One or more series of staminodes is often present in the female flower in this family; in *Lagarosiphon* there is generally a whorl of three, but in *Vallisneria*, as in *Maidenia*, no staminodes occur.

The male flower of *Maidenia* shows an extreme case of reduction. In the other genera of the family there is a trimerous perianth, generally represented by an inner and outer series, as in *Lagarosiphon*; in *Vallisneria* the inner series is absent. In the family as a whole there are from 1 to 5 whorls of stamens, some of which may be staminodial as in *Lagarosiphon*; *Vallisneria* is exceptional in having one whorl only, one or two members of which are sometimes infertile. The male flower of *Maidenia* shows a further and striking reduction as it consists merely of a single stamen with no trace of perianth or other structure. A resemblance to *Lagarosiphon* and *Vallisneria* is also found in the few and proportionately large pollen-grains. The slight indication of zygomorphy is also of interest in view of the comparison with the flower of *Vallisneria.*

To recapitulate: the female flower of *Maidenia* closely resembles that of *Vallisneria*; there is a slight reduction in the complete disappearance of the inner perianth whorl. The male spathe resembles in external form that of *Vallisneria*, but contains, in place of a stout central axis bearing numerous flowers with trimerous symmetry, merely a slender axis bearing numerous stamens.

The position of the new genus is clear. It belongs to the subfamily Vallisnerioideæ, and in this subfamily to the tribe Vallisnerieæ, of which hitherto we have known only two genera, the African *Lagarosiphon* and the almost cosmopolitan *Vallisneria.* The latter genus is represented in Australia by *V. spiralis* and two little known species endemic in Queensland, *V. gracilis* Bail., closely allied to *V. spiralis*, of which it has the appearance of a dwarf form, and the imperfectly known *V. caulescens.*

The genus is named after Mr. J. H. Maiden, Director of the

Sydney Botanic Gardens, to whom I am indebted for the opportunity of examining the specimens.

Maidenia

HYDROCHARIDACEARUM e tribu VALLISNERIEARUM genus novum.

Flores dioici, spathacei. Spatha mascula bivalvis, breviter pedunculata, ovoidea, stamina plurima in axe erecto spiraliter aggregata includens. Staminis filamentum breve, tenue; anthera late ellipsoidea, bilocularis. Spatha fœminea bifida, uniflora, pedunculo longissimo filiformi. Perianthium simplex, ad basin in segmentis tribus subæqualibus petaloideis divisum. Staminodia 0. Ovarium inferum, subcylindricum, e spatha protrusum, uniloculare; stigmata 3, segmentis perianthii alternantia et subæquantia, lata, bifida; ovula numerosa, parietalia, orthotropa, erecta vel ascendentia, quidque tegumento singulo indutum. Fructus (immaturus) fusiformis, obscure tricarinatus, basi a spathæ reliquis cinctus, pericarpio tenui. Semina numerosa, minuta.

Herba parva submersa, caule tenui, basi radicante et interdum stolonifero, erecto, simplici, undique dense folioso. Folia alternantia, conferta, anguste linearia, margine et apice sparse spinifera, basi vix vaginata. Spathæ masculæ in axillis foliorum vicinorum pseudoverticillatæ. Spathæ fœmineæ numerosæ, plures in propagulis axillaribus sessilibus pseudoverticillatis ordinatæ, florentes emersæ, post anthesin spiraliter retractæ et sub aqua maturescentes.

Species 1, in Australia boreali-occidentale.

M. rubra, sp. unica. Herba 5–6 cm. alt., caule simplici usque ad 2 mm. crasso. Folia 2 vel sæpius 3–4 cm. longa, basi caulis ·8–1·3 mm. lata, alibi ·4 mm. lata, superne setacea, apice et margine spinulis brunneis sursum versis instructa. Spatha mascula 2·5 mm. longa, pedunculo brevissimo. Spatha fœminea 2·5 mm. longa, lobis obtuse rotundatis vix 1 mm. longis, pedunculo 2–3 cm. longo; flos purpureus, 3 mm. longus, perianthii segmentis late ellipticis, vix 1 mm. longis. Fructus (immaturus) 4 mm. longus.

Hab. West Australia; near King river, East Kimberley.

Coll. W. V. Fitzgerald, October, 1906.

DESCRIPTION OF PLATE.

1. Portion of female plant, nat. size. 2. Group of female flowers with two enveloping sheathing leaves (somewhat diagrammatic), × 8. 3. Female flower in its spathe, × 16. 4. Young fruit, × 5. 5. Portion of inner face of same with ovules, × 16. 6. Cross-section of same showing the three ridges on the outer wall, × 20. 7. Ovule (after pollination), × 35. 8. A male plant with basal tuft of roots and a stolon, nat. size. 9. Pseudo-whorl of male spathes, × 4. 10. Single male spathe, × 16. 11. A male spathe with valves separated showing axis bearing anthers, × 20. 12. Anther, the division of the pollen-mother-cells is indicated, × 85. 13. Portion of leaf-surface, showing spines on margin, × 20. 14. Apex of leaf, × 20.

ON FISSIDENS:

WITH A NEW VARIETY OF F. PUSILLUS.

By J. A. Wheldon, F.L.S.

The genus Fissidens has been always a source of interest and also of trouble, to the botanist. The species are closely related, and their specific characters elusive and not always well defined. As the family Fissidentaceæ contains both cladocarpous and acrocarpous plants, its position varies considerably in the different systems of classification. Some insert it between the Acrocarpi and the Pleurocarpi, others place it in a distinct class by itself. In Lindberg's arrangement, greater importance being attached to the structure of the peristome than to the position of the seta, it is placed next the *Dicranaceæ*. The older bryologists, ignoring the very specialised leaf-structure, included all the species of Fissidens in the genus *Dicranum*.

The morphology of this anomalous leaf has been variously explained. The earliest bryologists considered that the whole leaf-structure corresponded to the ordinary moss leaf, and that the sheathing portion resulted from part of the tissue on one side being split into two layers. This explanation was proposed by B. de la Pylaie (in Journ. de Bot. 1814, 135) and was so improbable that it was soon discarded. In 1819 Robert Brown (in Trans. Linn. Soc. xii, 575) advanced the suggestion that the vaginant portion represented the true leaf, all the rest being an outgrowth from it. This view was supported by Bruch and Schimper (Bryol. Europ. i, 2), but rejected by Lindberg * and Braithwaite (Brit. Moss Flora, i, 166, 1881). Lindberg regarded the whole expansion, with the exception of one of the sheathing laminæ, as the true leaf, the excepted portion being regarded as a stipular appendage which had become adnate. In 1899 Mr. E. S. Salmon (in Ann. Bot. xiii, 103) fully reviewed these various theories, and produced convincing evidence in support of Brown's suggestion.

Mr. Salmon omitted one point which is well exemplified in the new variety to which this paper is devoted. In this moss the inferior lamina never reaches the base of the nerve, and frequently only half way to it. If the superior and inferior laminæ are regarded as representing the true leaf, then we must admit the possibility of the lower part of the nerve functioning as a petiole, a structure unknown in the rest of the mosses. Nor is any moss known to me in which the lamina fails to be directly connected with the stem from which it springs, from which one may fairly deduce the adventitious origin of these outgrowths.

Several groups of critical species occur within the range of even the British section of Fissidens, and very diverse opinions prevail as to the status of many of the named forms. The plants in the form-circle of *Fissidens viridulus* constitute one of these groups presenting difficulty to the systematist, and, for the introduction of a new variety here, some apology is perhaps needed. It is hoped, however, that the variety about to be described will be shown to have convincing claims to recognition, and also to have reliable sponsors, without whose encouraging remarks I should not have ventured to publish its description.

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* Lindberg: Utkast till en natur. Grupp. Europ. bladm. med topp. frukt., 16, 1878.

The three British species, *F. incurvus*, *F. pusillus*, and *F. viridulus*, are very closely allied, and each has varieties which some authors rank as species. This latter view is chiefly supported by those who attach much importance to the position of the inflorescence. *Fissidens incurvus* may be separated readily, as a rule, by its incurved capsule; and when this curvature is less marked, as in the var. *tamarindifolius*, by it being more or less inclined, and asymmetric. The upper leaves are shorter and broader than in allied plants. The remaining species have more regular capsules and narrower leaves. In *F. viridulus* the latter are tolerably uniform in shape, and the inflorescence is autoicous or synoicous. In *F. pusillus* the leaves are markedly dimorphous, the uppermost pair becoming suddenly longer narrower, more acuminate, and frequently somewhat ensiform. In the typical plant the leaves are few (3–4 jugous), and the inflorescence is dioicous; in the var. *madidus* the leaves are more numerous (5–8 jugous), the operculum more longly rostrate, and the inflorescence usually autoicous. This variety has some claims to be regarded as a distinct species, and Sullivant (Mem. Amer. Acad. n. ser. iii, 58, 1848) so described it under the name of *F. minutulus*. The plant about to be described is closely related to this species or variety.

In March, 1906, Mr. Albert Wilson and the writer found a number of small species of Fissidens, some of which were troublesome to determine, in the calcareous woods of the Silverdale district, West Lancashire. These gatherings from Heald Brow, Gateharrow Wood, Warton Crag, and other places, have been found to contain, sometimes in mixture, *F. bryoides*, *F. bryoides f. inconstans* (Schimp), *F. tamarindifolius*, and the subject of the present paper, which, in the *Flora of West Lancashire*, on the advice of Herr Georg Roth, we placed under *F. minutulus* Sulliv., adding a note on some of its peculiar features.

Mr. W. E. Nicholson pointed out objections to this view, and held that it could not be regarded as the same as var. *madidus* Spruce (*F. minutulus* Sull.). He wrote: "The Fissidens from Morecambe Bay is in many ways a remarkable plant, and I am unable to place it definitely. In some ways, especially in the longer, narrower leaves, notably the uppermost pair, the plant reminds me rather of *F. pusillus* var. *madidus*. It is, however, more robust than that, the leaf-cells are rather smaller and more opaque than is usual, and the inflorescence presents a further difficulty. Limpricht evidently includes what we call *F. viridulus* in his β *Hedwigii* of *F. bryoides*, and he regards it as synonymous with *F. impar* Mitt (*F. bryoides* var. *intermedius* Ruthe of Dixon's Handbook). His description of the inflorescence of this plant would suit yours to a great extent and the short dorsal lamina is also characteristic of this form, but there the analogy seems to end, as my plants of *F. impar* have rather short leaves, and it is obviously related to *F. bryoides*."

Mr. H. W. Dixon also seemed to consider the plant to be something new, and summed up its peculiarities very clearly in the following note: "Its characters are marked, as characters go in Fissidens. The numerous innovations, not unfrequently with terminal male flowers, the multijugous leaves, and the dorsal lamina ceasing markedly above the base, seem to separate it from all our species. I have carefully gone through Limpricht and Roth, but can find no European species that has these characters; *F. Bambergeri* seems most to approach it, but that is specially distinguished by its synoicous flowers, and I have not found any of those I have dissected to be synoicous."

Finally Herr Georg Roth of Laubach, to whom I forwarded specimens, replied: "Your Fissidentes are certainly interesting. The plant from Heald Brow is, as it were, a *Fissidens minutulus* with the characters of *F. tamarindifolius*, in producing innovations from the axils of the lower leaves, as well as on special stems. If Ruthe were still living he would no doubt have treated this plant as a distinct species. One could name it as a variety of *F. minutulus* with the inflorescence of *F. tamarindifolius*."

Both Spruce (in Journ. Bot. 1880, 361) and Dixon (Hand. Brit. Mosses, 130, 1904), no doubt rightly, regarded *F. minutulus* as only a variety of *F. pusillus*, and there seem to be objections either to assigning the Heald Brow plant to the var. *madidus* or making it a simple *forma* of that variety. In addition to the divergences referred to above, there is a difference in the size of the cells, in the length of the operculum, and in the habitat. I have no first-hand knowledge of the var. *madidus*, but it would appear to be a saxicole and aquatic, or at least subaquatic, plant. Spruce describes it as occurring on "dripping stones" near the Obelisk Bridge in Castle Howard Park. Dixon says "on dripping rocks." The plant from Heald Brow is terricole, occurring on loose sandy calcareous earth about the entrances to rabbit-holes, in a very dry locality, Heald Brow being a dry hill on the scar-limestone. In naming it after Mr. Albert Wilson of Garstang, who has done so much to further our knowledge of Lancashire plants, I am not only following a suggestion of Herr Roth, but also commemorating an ardent botanist and nature lover, to whom I and many other Lancashire plant-lovers owe more than can be expressed here.

FISSIDENS PUSILLUS var. WILSONI (var. nov.). *F. pusillo* var. *madido* Spr. affine et *F. tamarindifolio* floribus simillimus sed folii longioribus angustioribusque. Planta e basi declinata assurgens, haud raro surculis sterilibus basi radicantibus instructa. Caulis simplex vel sæpe ramosus. Folia 6–15 juga, infima dissita minima, superiora conferta, suprema valde longiora et angustiora, limbo angusto hyalino instructa ad apicem continuo vel sub eo evanido; margine integerrimo vel summo apice plus minusve lenissimo serrato; lamina dorsalis infra medium producta sed non ad basin folii descendens cellulæ circiter 7–10 μ diam. (10–14 μ in var. *madido*). Capsula minutula suberecta vel omnino erecta sicca deoperculato sub ore valde constricta; operculo brevirostro capsula circiter duplo vel triplo brevior. Flores masculi axillares etiam terminales in ramulis lateralibus plus minusve elongatus.

Habitat. On bare sandy calcareous soil about the entrance to rabbit-holes on the scar-limestone, Heald Brow, near Silverdale, West Lancashire, March, 1906. Albert Wilson & J. A. Wheldon.

From *F. pusillus* var. *madidus* it may be distinguished by its more robust and branching habit, more numerous leaves, smaller leaf-cells, and shorter lid; from *F. pusillus* (type) by the same characters, except the lid, which is similar, and by the peculiarities of the male inflorescence; from *F. incurvus* and its var. *tamarindifolius* by the straighter capsule, narrower leaves, and seta of a paler red; from *F. viridulus*, which the leaves of the sterile shoots strongly recall, by the inflorescence, and the narrow elongate terminal pairs of leaves, and from all of them but the first-named by the inferior lamina of the leaf never reaching the base.

It is undoubtedly most closely allied to the var. *madidus*, and were these two autoicous or pseudo-dioicous plants separated from *F. pusillus*, our plant would then be called *F. minutulus* var. *Wilsoni*. Braithwaite (*loc. cit.*) at first united the var. *madidus* with *F. pusillus*, and wrote: "The small species of the *incurvus* group present great variation in the position of the male flowers, and I am satisfied that no reliable specific characters can be founded on it." In a subsequent review of the genus in the same work he recognised *F. minutulus* Sull., its chief characters being the situation of the male flowers on long basal branches, or on separate plants, its longer lid, and denser cells. These points seem hardly sufficient, *in this genus*, for the separation of a species of the first magnitude, although under some circumstances they might have weight. The var. *Wilsoni*, also, differs only in equally unstable features, the principal ones being the length of the inferior lamina and the peculiarities of the inflorescence.

It is chiefly, and probably normally, autoicous. No synoicous or paroicous flowers have been detected, but there is *prima facie* evidence that it is on rare occasions dioicous, and to that extent it may be considered to be heteroicous. The following five variations of the inflorescence have been noted:—

1. The normal and most frequent condition, in which the plant is rather robust and well branched. The male flowers are terminal on true branches and also axillary, the latter ones being either almost sessile and budlike or shortly pedicellate, the shoots having somewhat rhizinous bases.

2. A rhizantoicous form, in which weak shoots bearing male flowers arise from amongst the radical tomentum of the female plant.

3. A cladautoicous form like No. 1, but without axillary buds or shoots. This may be simply a less vigorous state of No. 1.

4. A rare pseudo-dioicous state, in which the female plant is small and poorly developed, and shows no trace of male inflorescence. As the capsules ripen, sterile axillary branchlets appear at times, and these may ultimately produce antheridia. If the main stem should innovate and eventually yield a second crop of archegonia, it is probable that these shoots would bear terminal male flowers. This, of course, is at present mere supposition.

5. Simple stems bearing terminal male flowers. These male plants are not abundant, and the possibility must be borne in mind that they may ultimately develop female flowers when older. Of this, however, there is no evidence at present. Their origin may be accounted for in several ways. They may arise from the axillary buds or shoots of No. 1. These may under some conditions be caducous, and, having rhizinous bases, would succeed in establishing themselves as separate plants. They may also originate from detached shoots of the rhizantoicous form. If they arise from an original protonema, their full development may have been arrested by starvation, resulting in a suppression of one of the sexes.

The utilisation of variations of inflorescence for the separation of species of mosses and hepatics has been carried to excess by some authors, notably in this genus, and in *Webera*, *Bryum*, *Cephalozia*, etc. The more attention one pays to groups of plants in which the species depend principally on the situation of the inflorescence, the more one inclines to the opinion that this feature is sometimes assigned an importance unwarranted by its reliability. In discussing this subject with Mr. W. E. Nicholson in 1906, he wrote: "With regard to this point, I think it is better to recognise that the inflorescence is heteroicous in some species, and that species founded on inflorescence alone are often unsound." That Mr. H. N. Dixon (*loc. cit.*) holds similar views may be inferred from the fact that he denies specific rank to *Fissidens impar*, *F. minutulus*, and *F. tamarindifolius*. The inconstancy of the inflorescence in *F. pusillus* var. *Wilsoni*, as described above, and in other species of Fissidens, must cause us to regard with more or less suspicion the status of species founded mainly on the position of the flowers in some groups of both mosses and liverworts.

Continuous observation of growing plants would be useful in clearing up some of the difficulties regarding the inflorescence of the var. *Wilsoni*, and also in determining the duration of the plants. The smaller species of Fissidens do not appear to be of ephemeral habit, like some kinds of *Pottia*, *Ephemerum*, etc., and are perhaps never, strictly speaking, even annual. If the var. *Wilsoni* be considered as such, it must produce more than one crop of capsules in the season, since well-developed plants occasionally show young perichætia, ripe fruit, and old perichætia from which the setæ have fallen, on the same plant. The type, *F. pusillus*, may possibly be an annual species; if so, the var. *Wilsoni* probably represents a race derived from it of at least biennial, and it may be of still longer duration. But without cultural experiments this point cannot be satisfactorily determined.

TROPICAL AMERICAN RUBIACEÆ.—VII.

By H. F. Wernham, D.Sc., F.L.S.

(Continued from Journ. Bot., 1915, p. 15.)

VII.—The Genera.

The whole family of Rubiaceæ, as at present constituted, comprises considerably over 400 genera. Of these, less than one half occur in the American Tropics; the number being, as I compute it in the present work, 182.

Of this number, again, the very large majority are peculiar to the New World, and nearly all of these are confined to the Tropics, the Rubiaceæ being essentially a tropical family.

The exceptions, with representatives in both hemispheres, are relatively few, but worthy of note. They are as follow:

Cinchonoideæ. Hedyotideæ: *Oldenlandia*, *Anotis*, **Pentodon*.—Rondeletieæ: *Lindenia*.—Naucleæ: *Uncaria*, *Cephalanthus*.—Mussændeæ: **Sabicea*.—Gardenieæ: *Randia*.—Hamelieæ: **Bertiera*.

Coffeoideæ. Guettardeæ: *Guettarda*, *Antirrhœa*.—Ixoreæ: *Coffea*, *Ixora*.—Psychotrieæ: *Mapouria*, *Psychotria*, *Geophila*, *Cephaëlis*.—Pæderieæ: *Pæderia*.—Anthospermeæ: *Nertera*.—Morindeæ: *Morinda*.—Spermacoceæ: **Diodia*, *Hemidiodia*, **Spermacoce*, **Mitracarpum*.—Galieæ: *Sherardia*, *Galium*, *Rubia*.

A total of 27 genera. Of these, the six marked with an asterisk are represented in the Old World only in Africa* and the neighbouring tropical islands (Madagascar and the Mascarine Islands). The rest, with very few exceptions, occur generally throughout the Tropics; a few, notably the Galieæ (*infra*), are distributed throughout the world, temperate as well as tropical. The *Galieæ* form a tribe of essentially temperate habitat.

These statements go to show that the evolution of Rubiaceæ in the Tropics of the New World has proceeded very largely on individual lines; as is to be expected, in view of the wide and (geologically) long separation between the two areas concerned.

Distribution.—Our scope does not permit us to enter into any closeness of detail regarding the distribution of the genera within the area in question; but a few of the main facts may be of service in the identification of some groups. The warmer regions of the New World, regarded from the standpoint of the occurrence of the genera under consideration, fall into six groups, which are dealt with briefly in succession below:

(1) *Northern area*, including southern Florida, southern California, and northern Mexico. Comparatively few of our genera

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* See Engler: Sitz. Kön. Preuss. Akad. Wiss. 1905, vi, "Über floristische Verwandtschaft zwischen dem tropischen Afrika und America," etc.

occur in this area. Of these, the following are peculiar to it: *Pinckneya*, *Houstonia*, *Kelloggia*, *Mitchella*, *Crusea*, and *Didymæa*. The following have migrated, so to speak, from the warmer areas, where they are principally represented: *Exostemma*, *Lindenia*, *Hamelia*, *Genipa*, *Chiococca*, *Mitracarpum*, *Richardsonia*, *Relbunium*. The next group of genera are essentially West Indian, rock-dwelling marine plants; they occur elsewhere only on the opposite coast of southern Florida: *Catesbæa*, *Strumpfia*, *Ernodea*, *Erithalis*. The remainder of the genera in this area are either cosmopolitan, like the Galieæ, or of general occurrence in the warmer parts of the world; such are *Cephalanthus*, *Oldenlandia*, *Randia*, *Guettarda*, *Morinda*, *Psychotria*.

(2) *Central American* area, including the warmer parts of Mexico, and the remainder of Central America. Many of the genera here are also met with in South America. *Bouvardia* is an exception, as this occurs elsewhere only in North America. These are peculiar to this area: *Ravnia*, *Deppea*, *Notophlebia*, *Ophryococcus*, *Xerococcus*, *Asemnantha*, and *Placocarpa*. The recently-described *Otocalyx*, *Plocaniophyllon*, *Stylosiphonia*, and *Pinarophyllon* were collected once in Mexico, by Purpus.

(3) *West Indies*.*—Out of about 60 Rubiaceous genera occurring in this region, about twenty-five are found generally in the American tropics, but not elsewhere; nineteen or twenty are endemic (many in Cuba); *Portlandia* and *Lindenia* have been found only in the West Indies and Central America; *Lasianthus* and *Antirrhœa* occur only in the Old World, outside the West Indies. The remainder, apart from the Florida-genera mentioned above, are the widespread forms referred to at the end of our account of the Northern area.

(4) *Tropical South America, including Brasil*.—This is the heart of the whole region, with a wonderfully rich flora, very imperfectly known. Beside a considerable number confined exclusively to this area, several genera which are most richly represented here have, we have already noticed, species in the previous areas in the northerly direction; many, too, are represented in the opposite direction of Paraguay and the warmer parts of temperate South America, now about to be considered.

(5) *Paraguay and Uruguay*.—The flora of this area is intimately associated with that of the neighbouring parts of Brasil. The Rubiaceous genera number less than forty, and none, apparently, are endemic. The following Brasilian genera, that are otherwise unknown outside the tropics of South America occur: *Sphinctanthus*, *Coussarea*, *Declieuxia*, *Stælia*, *Emmeorhiza*. *Alibertia*, *Thieleodoxa*, and *Rudgea* are represented in the West Indies, but not elsewhere outside South America. The other Paraguayan genera are either such South American genera as have migrated as far as Central America, Mexico, or even, in the case of *Genipa* and *Chiococca*, as far as North America; or, the widespread genera already referred to (Galieæ, *Psychotria*, etc.).

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* Not including Trinidad, which is regarded, for floristic purposes, as South American.

(6) *Chili and Argentina* concern us but little. This area is remarkable chiefly for the Cruckshanksieæ, which are endemic, and the curious, pustulate, toothed-leaved *Heterophyllæa*, from Northern La Plata, also endemic. For the rest, the only Rubiaceous genera this area shares with the rest of warmer America are the ubiquitous *Oldenlandia*, *Nertera*, and certain Galieæ.

* * * *

It is rarely a matter of much difficulty to recognize, almost at sight, the family characters of a Rubiaceous plant, even in the dried state. The leaves are invariably opposite or verticillate, and simple, with perfectly entire margins.* Between the petiole-bases of the two leaves, or of each adjacent pair of leaves at a node, an "interpetiolar" stipule appears in most cases. This may be rapidly caducous, but it can be detected in association with the youngest leaf-members; and even when the stipule has fallen, its trace is present in the form of a scar or line. These characters, coupled with the presence of an epigynous isomerous flower, establish any specimen possessing them as a Rubiacea beyond doubt; with the practical exception of the familiar tribe Galieæ, including some 10 per cent. of the family, in which the foliar organs are arranged in whorls of two to eight or more at each node. These may be brought into line with the rest of the family by supposing that some of the "leaves" at each node are modified interpetiolar stipules.

The morphology of the foliar organs in Galieæ is discussed at length in a masterly manner by Lindley in his *Vegetable Kingdom* (ed. 3, pp. 768–771). This author separates this tribe from the rest, according it family-rank—Galiaceæ. I strongly favour the same course.

An interesting transition between this last-named group and the Rubiaceæ proper is furnished by the Mexican *Didymæa* (fig. 3). In this case the stipules are appreciably different from the leaves; each consists of a bipartite, glandular, erect structure which at length becomes recurved and functions as a double-hooked climbing organ. The same transition, indeed, is reflected in the divided or fimbriate stipules in other Rubiaceous tribes, notably the herbaceous *Spermacoceæ*.

The theoretical principle of these interpetiolar stipules is readily explicable by a diagram.

The accompanying figures, 1, 2, represent a portion of stem bearing two opposite leaves, A, B, at a node. Each leaf (fig. 1) has its pair of stipules at the petiole-base, A with stipules a_1, a_2, B with b_1, b_2. If it be conceived that stipule a_1 of leaf A travels around the stem to fuse with stipule b_1 of leaf B, as indicated by the dotted lines and arrows in fig. 1, while stipule a_2 behaves similarly in regard to stipule b_2, the condition indicated in fig. 2 will be arrived at. The stem-axis will bear interpetiolar stipules composed of the fusion-products of such members as $a_1 + b_1$, $a_2 + b_2$, the components being derived, in descent, by some such process as that suggested above. The biological motive of this process, from the standpoint of Natural Selection, is, conceivably, the protection, by the formation of a stipular sheath, of the delicate growing stem-apex from the menaces of a moist-tropical heat—a suggestion that I have already proferred in the *New Phytologist*, vol. xi (1912), p. 234.

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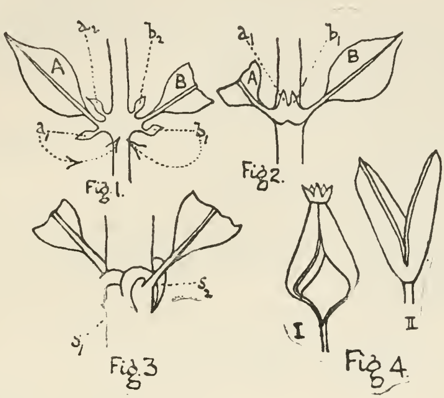
* The sole exceptions to this latter are afforded, in the American genera, at any rate, by the genus *Pentagonia*, some species of which have pinnately-lobed leaves, and *Heterophyllæa*, a monotypic genus with toothed leaves.



Figs. 1, 2.—Diagrams to illustrate the origin of the interpetiolar stipules in Rubicaeæ.

Fig. 3.—*Didymæa*: s_1, s_2, bipartite stipules. Fig. 4.—Dehiscing capsules of species of (i) *Cinchona*, (ii) *Ladenbergia*.

* * * *

The principal object of the present paper is to provide a practical means of ascertaining, as readily as may be, the genus of any Rubiaceous plant native in the American Tropics. With this object in view I have prepared the subjoined keys—firstly to the tribes, and then to the genera of each tribe in succession. The classifications of Bentham & Hooker and of Engler have both been freely used in this connection; and in all doubtful or difficult cases the plants have been examined and the original generic descriptions consulted.

It should be clearly understood that no attempt is made in this place to dispose of any discrepancies either of classification or of nomenclature between the two systems; where such exist, both systems are represented. Ready and practical identification is aimed at here. Thus, Bentham & Hooker's *Hamelieæ* appear below both as a separate tribe, and as individual members of the Gardenieæ; and both generic names are given in cases where the two systems differ.

Note.—The nomenclature, etc., of Engler's system, in cases where this differs from that of Bentham & Hooker, is shown in round brackets, thus: (Oldenlandieæ).

Key to the Tribes of Rubiaceæ occurring in Tropical America.

A. Ovary with 3 or more ovules in each chamber (except *Platycarpum*, in Henriquezieæ, with 2 ovules per loculus; and *Cephalanthus*, in Naucleæ; very rarely *Oldenlandia* and *Hedyotis*; and occasionally *Alibertia*; in which cases the ovary-cells are uniovulate).
B. Fruit dry, capsular or 2–4 coccoid, or nucumentaceous (or, in *Cephalanthus*, a fleshy syncarp).
Flowers in compact globose heads .. .. .. Naucleeæ
Flowers not in compact globose heads.
Flowers bilabiate with imbricate corolla; stamens unequal, inserted high in the tube: 2 or 4 ovules per loculus .. .. Henriquezieæ
Flowers regular.
Seeds winged, imbricate, shielding each other from below upwards .. .. Cinchoneæ
Seeds nearly always unwinged (winged on one side in *Sickingia*); if winged, then set horizontally.
Corolla imbricate or contorted; never valvate .. Rondeletieæ
Corolla valvate.
Seeds very many, horizontal; stipules entire or bifid. Trees and shrubs, usually with conspicuous flowers .. .. .. Condamineeæ
Seeds relatively few, peltately-affixed. Stipules often fimbriate-setose. Usually herbs .. Hedyotideæ (Oldenlandieæ)
BB. Fruit fleshy
Corolla valvate (except sometimes *Isertia*, in Mussændeæ, with contorted-imbricate corolla).
Seeds minute, angled .. .. Mussændeæ
Seeds large, or fairly so, compressed .. .. .. Catesbæeæ*
Corolla imbricate.
Seeds rather large, compressed .. .. .. Catesbæeæ
Seeds minute, subangular, pitted .. .. .. Hamelieæ*
Corolla contorted.
Seeds many, minute, pitted, rarely tuberculate .. Hamelieæ
Seeds usually not numerous, rather large; testa smooth or fibrous .. .. Gardenieæ
AA. Ovary with 2 ovules in each chamber (see also *Platycarpum* above).
Corolla valvate; ovary bilocular (Alpine plants, chiefly Chili).. .. .. Cruckshanksieæ*
Corolla contorted; ovary 5–7-locular .. .. .. Retiniphylleæ*
AAA. Ovary with 1 ovule in each loculus (sometimes 2 in *Coussarea*, the ovary being unilocular by evanescence of the thin septum).
Ovules pendulous.
Stamens inserted in the throat of the tube; endosperm absent or scanty usually; seed-stalk thick .. Guettardeæ
Stamens inserted at base of tube; seeds albuminous.. Chiococceæ
Ovules erect or ascending.
Corolla contorted .. .. Ixoreæ
Corolla valvate.
Ovule affixed to base of ovary.
Ovary unilocular, or bilocular with very thin septum .. .. Coussareæ
Ovary 2- or more-celled: septum thick.
Flowers hermaphrodite: stamens usually inserted in throat of corolla.

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* The genera included by Bentham & Hooker in these tribes are distributed variously in Engler's system among the other tribes.

Style short; fruit drupaceous; odourlses woody plants .. .. PSYCHOTRIEÆ
Style long, filamentous; fruit dry, dehiscent; fetid climbing plants .. .. .. PÆDERIEÆ
Flowers usually diœcious; stamens usually inserted at base of corolla .. .. .. ANTHOSPERMEÆ
Ovule affixed to septum.
Stipules entire, not leafy; trees and shrubs .. MORINDEÆ
Stipules fimbriate; herbs and subherbaceous .. SPERMACOCEÆ
Stipules like the leaves, forming whorls with them GALIEÆ
Stipules each a pair of small hooks (Mexican) .. *Didymæa* in Galieæ

KEY TO THE GENERA OF EACH TRIBE.

NAUCLEÆ.

Fruit forming a globose syncarp, the floral calyces being confluent; ovules solitary in the flowers .. .. *Cephalanthus*
Fruits separate, each a capsule with many ovules. Hooked climbers .. .. *Uncaria* (*Ourouparia*)

CINCHONEÆ.

A. Corolla-lobes valvate (EUCINCHONEÆ).
Placenta pendulous from apex of loculus .. .. .. *Alseis*
Placenta ascending or erect from base of septum.
Climbing plants .. .. *Manettia*
Erect plants .. .. *Hindsia*
Placenta adnate to middle of septum.
Leaves varnished, metallic .. .. *Stilpnophyllum*
Leaves not varnished, nor metallic.
Leaves coarsely crenate, whole plant glandular-pustular (Northern La Plata) .. .. .. *Heterophyllæa*
Leaves entire.
Branchlets spine-like, leaves minute, flowers solitary (Bolivia) .. .. *Lecanosperma*
Branchlets not spine-like, leaves not minute, flowers many in an inflorescence.
Herbs or small sub-shrubby plants: flowers long narrow-tubular: capsule loculicidal .. *Bouvardia*
Trees, or large shrubs: capsule (exc. in *Macrocnemum* and *Joosia*, *q.v.*) septicidal.
*Capsule splitting from below upwards .. *Cinchona*
*Capsule splitting from above downwards.
Fruit dehiscing into 4 spirally-coiled valves: corolla-lobes bifid .. .. .. *Joosia*
Fruit not so dehiscing: corolla-lobes entire or sub-entire.
Capsule loculicidal .. .. *Macrocnemum*
Capsule septicidal.
Valves bifid .. .. *Remijia*
Valves entire.
Capsule small (barely 1 cm.). Flowers closely aggregated .. .. *Pimentelia*
Capsule large (over 2 cm.). Flowers loosely associated, stalked .. *Ladenbergia* (includes *Cascarilla*)

* See fig. 4.

AA. Corolla-lobes imbricate or contorted (Hillieæ).
B. Lobes contorted (or one external in *Calycophyllum*).
One or more calyx-lobes expanded as an attractive leaf-member.
Flower zygomorphic (Peru) .. .. *Capirona* [including *Monadelphanthus*, with united filaments]
Flower regular.
Calyx becoming deeply two-lipped .. .. *Schizocalyx*
Calyx truncate.. .. .. *Calycophyllum*
Calyx-lobes all subequal, unexpanded
Stamens unequal .. .. *Ferdinandusa*
Stamens equal.
Stigma clavate.
Calyx caducous: seeds bearded .. .. .. *Hillia*
Calyx persistent: seeds not bearded .. .. *Cosmibuena*
Stigma bifid .. .. *Ravnia*
BB. Lobes imbricate.
Flower regular.
Corolla urceolate.. .. .. *Sprucea.*
Corolla not urceolate.
Placenta semicircular, adnate to septum: filaments free, inserted on the corolla-tube .. .. *Exostemma*
Placenta stalked, pendulous: filaments connate below, almost epigynous (West Indian plant) *Solenandra*
Flower zygomorphic.
Style clavate: flowers large: placenta bell-shaped, stalked .. .. *Coutarea*
Style with two linear arms: flowers small, linear corolla-lobes: placenta semicylindric, adnate to septum .. .. *Molopanthera*

Henriquezieæ.

Calyx 4-merous, the limb circumsciss .. .. .. *Henriquezia*
Calyx 5-lobed, the lobes separately deciduous .. .. *Platycarpum*

Condamineæ.

Calyx-lobes unequal, one or more expanded as an attractive leaf-organ. Corolla terete.
Corolla-lobes glabrous within; stamens affixed at middle of corolla. Seeds small, unwinged .. . .. *Pogonopus*
Corolla-lobes tomentose within; stamens affixed at base of corolla. Seeds appreciably winged (chiefly North Am.) .. .. *Pinckneya*
Calyx-lobes all similar.
Corolla-tube elongated, angled, lobes reduplicate-valvate.
Corolla subcampanulate, considerably widened above.. *Portlandia*
Corolla tubular, not appreciably widened above .. *Isidorea*
Corolla-tube not elongated, terete, lobes simply valvate.
Calyx deciduous, anthers dehiscing longitudinally .. *Condaminea*
Calyx persistent.
Anthers dehiscing longitudinally.
Flowers not small (2·5 cm.) in few-flowered racemes; calyx entire; corolla-tube twice as long as lobes (Hayti plant) .. .. .. *Picardæa*
Flowers very small, in many-flowered inflorescences; corolla-lobes almost free .. .. *Chimarrhis*
Anthers dehiscing by pores.
Pores terminal, at apex of anther .. .. .. *Rustia*
Pores lateral, below apex .. .. .. *Tresanthera*

Rondeletieæ.

A. Corolla-lobes imbricate
Inflorescence with expanded foliar attractive organs.
Stamens affixed in throat of short corolla, exserted.
Flowers in cymes .. .. *Warscewiczia*
Stamens unequal, included: corolla ± curved. Flowers in spikes .. . . *Pallasia*
Inflorescence without foliar attractive organs.
B. Capsule loculicidal.
Seeds large, winged on one side .. .. .. *Sickingia*
Seeds small, unwinged.
Calyx closed in bud, beaked, splitting into two, and early deciduous .. .. *Stevensia*
Calyx open, persistent .. .. *Rondeletia*
BB. Capsule septicidal.
Capsule semi-superior; squarrose sea-coast shrub with small xerophilous leaves and solitary flowers. Bracteoles accrescent in fruit .. .. *Rachicallis*
Capsule quite inferior; inflorescence many-flowered; bracteoles not accrescent.
Corolla-tube hairy inside; anthers exserted; leaves large (Trop. S. Amer.) .. .. *Bathysa*
Corolla-tube naked; anthers included; leaves small, coriaceous (West Indies) .. .. *Neomazæa*
BBB. Capsule opening apically, slightly superior .. .. *Pinarophyllon.*
AA. Corolla-lobes contorted.
Small herbs.
Stamens included; leaves opposite .. .. .. *Sipanea*
Stamens exserted; leaves 3–∞-whorled .. .. .. *Limnosipanea*
Trees or shrubs.
Ovary 4-locular, few-seeded .. .. *Acrobotrys*
Ovary 2-locular, many-seeded.
One or more calyx-lobes enlarged as an attractive leaf-organ .. .. *Pteridocalyx*
Calyx-lobes all subequal, not expanded.
B. Corolla-tube much elongated, many times exceeding the lobes.
Capsule loculicidal .. .. *Augusta*
Capsule septicidal .. .. *Lindenia*
BB. Corolla short, often scarcely exceeding calyx, tube rarely longer than lobes.
Endocarp splitting as a net from the valves of the fruit .. .. *Schenckia*
Endocarp not separating from exocarp.
Flowers closely crowded, many together .. *Phitopis*
Inflorescence lax, or flowers solitary.
Stamens appendiculate at base; capsule loculicidal .. .. *Elæagia*
Stamens not appendiculate at base.
Capsule loculicidal (Central Am.) .. *Deppea*
Capsule septicidal (Guiana) .. .. *Chalepophyllum*
BBB. Corolla-tube long, very slender, lobes long linear .. *Stylosiphonia*

Hedyotideæ.

(Oldenlandieæ.)

Calyx-lobes foliaceous, dissimilar, one or more accrescent later. Alpine dwarf plant .. .. *Cruckshanksia* [inc. *Oreopolus*, Bentham & Hooker's "Cruckshanksieæ."]

Calyx-lobes all similar, not foliaceous nor accrescent.
Flower 5-merous.
Capsule loculicidal, fruiting pedicels reflexed .. .. *Pentodon*
Capsule septicidal, with elongated apex (Brasil) .. *Leptoscela*
Flower 4-merous.
A. Seeds angled, sometimes winged.
B. Seeds warted; capsule with cruciform apical dehiscence .. .. *Lipostoma*
BB. Seeds smooth or dotted; usually delicate herbs, pedicels very slender .. .. *Oldenlandia*
BBB. Seeds rugose; shrubs .. .. *Plocaniophyllon* [inc. *Hedyotis*]
AA. Seeds boat-shaped, or plano-convex.
Roots tuberous (West Indies) .. .. *Lucya*
Roots not tuberous.
Leaves leathery, imbricate.
Flower elongated, hypocrateriform with campanulate limb .. .. *Teinosolen*
Flower short, funnel-shaped .. .. .. *Mallostoma* (*Arcythophyllum*)
Leaves membranous, not overlapping.
Stipules entire; flowers not small .. .. *Houstonia*
Stipules divided; flowers small .. .. .. *Anotis*

MUSSÆNDEÆ.

Inflorescence terminal.
Flowers in a close involucrate head.
Leaves apparently alternate .. .. *Didymochlamys*
Leaves opposite .. .. *Schradera*
Flowers not in a close capitulum.
Inflorescence elongate, spiciform.. .. .. .. *Gonzalea* (*Gonzalagunia*)
Inflorescence not spiciform, nor especially elongate.
One or more calyx-lobes petaloid .. .. .. *Carmenocania*
Calyx lobes all similar.
Ovary bilocular .. .. *Cassupa*
Ovary 4–6-locular .. .. *Isertia*
Inflorescence axillary.
Creeping herbs, with capitate, stalked inflorescence .. *Coccocypselum*
Shrubs or Trees.
Leaves with many, close, parallel striolæ (*moirée*-marking) in the vein-meshes below.
Flower regular; stamens straight erect, included; ovary 2-celled (sometimes almost unilocular in *Hippotis*).
Inflorescence 1–3-flowered .. .. *Hippotis*
Inflorescence ∞-flowered.
Inflorescence terminal; calyx-lobes ample, subfoliaceous .. .. *Somme* *
Inflorescence axillary.
Calyx campanulate, obscurely 5-lobed; corolla-tube obconic (Costa Rica) .. .. .. *Notophlebia*
Calyx spathaceous, or conspicuously toothed; corolla-tube cylindric .. .. .. *Pentagonia* *
Flower zygomorphic; stamens bent below; ovary unilocular .. .. *Tammsia* *
Leaves without *moirée*-striolation.
Stamens exserted .. .. *Euosmia*
Stamens included.
Corolla-lobes caudate acuminate .. .. .. *Patima*
Corolla-lobes never lengthily acuminate.
Ovary 3–5-locular .. .. *Sabicea*

Ovary bilocular.
Filaments elongate, slender (Colombian) .. *Neosabicea*
Anthers sessile, or nearly so (Central American).
Anthers minute, caudate-ovate .. .. *Xerococcus*
Anthers linear-oblong .. .. .. *Ophryococcus*

HAMELIEÆ

Calyx-lobes equal.
Ovary 4–5-locular.
Corolla contorted in æstivation .. .. *Bertiera*
Corolla imbricate.
Corolla markedly tubular, usually 5-angled .. . *Hamelia*
Corolla shortly funnel-shaped .. .. *Bothriospora*
Ovary 2-locular.
Anthers exserted ; inflorescence axillary .. .. *Hoffmannia*
Anthers included ; inflorescence terminal .. .. *Pseudohamelia*
One calyx-lobe foliaceous .. .. *Otocalyx*

CATESBÆEÆ.

Spiny plants, with small stipules.
With leaves .. .. *Catesbæa*
Leafless .. .. *Phyllacantha*
Without spines, and with large stipules.
Ovary unilocular .. .. *Tammsia*
Ovary bilocular.
Calyx lobes foliaceous .. .. *Sommera*
Calyx spathaceous, or 5–6-lobed; leaves very large, often lobed .. .. *Pentagonia*

GARDENIEÆ.

A. Corolla-lobes contorted.
B. Seeds comparatively large, with smooth or fibrous testa.
C. Flowers hermaphrodite (EUGARDENIEÆ).
D. Inflorescence terminal, or terminal and axillary.
Corolla not regular ; buds curved .. .. .. *Posoqueria*
Corolla regular; buds straight.
Ovary unilocular (West Indies) .. .. .. *Casasia*
Ovary septate (none West Indian, except *Randia*).
Style not exserted.
Inflorescence many-flowered, conspicuous lax cymes.
Corolla-tube very long .. .. .. *Tocoyena*
Corolla-tube barely 1·5 cm. long .. .. *Dolichodelphys*
Flowers solitary, or 3–4 in a head.
Corolla-tube at most barely exceeding the limb, usually shorter .. .. .. *Sphinctanthus*
Corolla-tube elongate .. .. .. *Randia*
Style far exserted .. .. (*Retiniphyllum* and *Synisoon* (see next key).)
DD. Inflorescence lateral.
Corolla-tube villous in both throat and base. Stigma tapering. Testa fibrous .. .. *Genipa*
Corolla-tube hairy in throat or base. Stigma not tapering. Testa never fibrous .. .. .. *Randia*
CC. Flowers diœcious (CORDIEREÆ).
Stipules forming a conical cap, connate into a sheath, deciduous above a circular slit, leaving a persistent basal caruncle.
Male flowers in cymes; female usually solitary, rarely 2–3 in a head .. .. *Duroia*

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* In the tribe Catesbææ (*q. v.*) according to Bentham & Hooker.

- Male and female flowers both in cymes .. .. *Amajoua*
- Stipules free, or connate at base—not forming a cap dehiscent by a transverse slit.
- Male flowers solitary, female in fascicles .. .. *Schachtia*
- Male and female flowers both numerous, in capitate inflorescences .. .. *Garapatica*
- Male flowers many together, female solitary.
- Male inflorescence a uniform or interrupted spike *Stachyarrhena*
- Male flowers clustered into a head or panicle.
- Ovary and berry strongly ribbed; stipules sheathing .. .. *Billiottia* (*Melanopsidium*)
- Ovary and berry smooth.
- Male inflorescence lateral, terminating short shoots; pollen in tetrads. Thorny shrubs, with chaffy stipules .. .. *Basanacantha*
- Male inflorescence terminal; pollen simple. Unarmed shrubs.
- Male and female flowers isomerous. Ovary 2–∞-locular .. .. *Alibertia*
- Male and female flowers not isomerous. Ovary unilocular .. .. .. *Thieleodoxa*
- BB. Seeds small, angular, with pitted testa .. .. (*Bertiera*)*
- AA. Corolla-lobes imbricate.
- Ovary 4–5-locular.
- Corolla tubular, 5-angled, stamens inserted at base of tube .. .. (*Hamelia*)*
- Corolla shortly funnel-shaped, stamens in throat of tube (*Bothriospora*)*
- Ovary 2-locular.
- Stamens inserted in throat of corolla .. .. .. (*Hoffmannia*)*
- Stamens inserted at base of corolla.
- Spiny plants with leaves .. .. (*Catesbæa*)†
- Spiny plants, leafless (like *Colletia*) .. .. .. (*Phyllacantha*)†

RETINIPHYLLEÆ.

- Corolla and andrœcium 8-merous .. .. *Kotchubæa*
- Corolla and andrœcium 5-merous.
- Ovules pendulous .. .. *Synisoon*
- Ovules not pendulous .. .. *Retiniphyllum*

GUETTARDEÆ.

- Corolla-lobes imbricate.
- Fruit separating into two small semi-cylindrical cocci .. *Machaonia*
- Fruit drupaceous, indehiscent.
- Calyx deciduous .. .. *Guettarda*
- Calyx persistent.
- Filaments short. Stipules triangular, caducous .. *Antirrhœa*
- Filaments elongated. Stipules connate into a persistent sheath .. .. *Laugeria*
- Corolla-lobes valvate.
- Corolla-tube slender, much elongated .. .. .. *Chomelia*
- Corolla-tube short, not slender.
- Flowers secund in divaricate unilateral spikes (Bolivia) *Tournefortiopsis*
- Flowers very small in panicles of small clusters .. *Malanea*

CHIOCOCCEÆ.

- AA. Corolla-lobes valvate.
- Inflorescence terminal.
- Fruit a drupe of 5–∞ pyrenes .. .. *Erithalis*
- Fruit a bilocular septicidal capsule .. .. .. *Ceratopyxis*

* See *Hamelieæ, supra.*

† See *Catesbæeæ, supra.*

Inflorescence axillary.
Anthers dorsifixed.
Stipules becoming a truncate sheath. Fruit a drupe *Phialanthus*
Stipules triangular, cuspidate. Fruit a bilocular septicidal capsule .. .. *Shaferocharis*
Anthers basifixed.
Style two-branched. Brasil plant, leaves very tough, shining .. .. *Salzmannia*
Style simple.
Inflorescence lax .. .. *Chiococca*
Inflorescence fasciculate .. .. *Asemnantha*
AA. Corolla-lobes imbricate (West Indies, except *Placocarpa*).
Flowers 5-merous .. .. *Chione*
Flowers 4-merous.
Stamens inserted at corolla-base ; anthers basifixed .. *Scolosanthus*
Stamens inserted in corolla-throat ; anthers dorsifixed (Mexico) .. .. *Placocarpa*

IXOREÆ.

Corolla-lobes contorted ; ovule affixed at or above middle of septum.
Flowers with calyculate calyx .. .. *Coffea*
Calyx simple .. .. *Ixora*
Corolla-lobes imbricate ; ovule at base of loculus.
Stamens free ; calyx ample .. .. *Phyllomelia*
Stamens connate ; calyx small, toothed (sea-coast, Florida and West Indies).. .. .. *Strumpfia.*

MORINDEÆ.

Flowers confluent by their calyces ; style two-branched .. *Morinda*
Flowers entirely separate ; stigma capitate .. .. .. *Appunia*

COUSSAREÆ.

Ovules connate, borne on a common basal column.. .. *Coussarea*
Ovules separate in a unilocular ovary, collateral, basilar .. *Faramea*

PSYCHOTRIEÆ.

A. Inflorescence many-flowered, terminal or axillary *and* terminal.
Inflorescence an involucrate head.
Seed flat on ventral side ; creeping herbs .. .. *Geophila*
Seed deeply furrowed on ventral side ; usually shrubs *Cephaëlis*
Inflorescence without involucre.
Fruiting carpels much laterally compressed.
Ovule borne on a much swollen ascending funicle .. *Congdonia*
Ovule basal, with normal funicle .. .. .. *Declieuxia*
Fruiting carpels semicircular in transverse section, forming a pisiform fruit.
Seed flat on ventral side .. .. (*Mapouria*)*
Seed deeply furrowed on ventral side.
Corolla-tube short, straight, not gibbous at base.
Inflorescence not thyrsoid .. .. .. *Psychotria*
Corolla-tube elongated, curved, usually gibbous on one side at base. Inflorescence thyrsoid.
Ovary 2–5-locular .. .. *Palicourea*
Seed with inrolled ventral surface. Stipules pectinate.
Corolla-lobes usually horned .. .. .. *Rudgea*
AA. Inflorescence many-, but often few-flowered, axillary, cymes often closely congested.

- Ovary 3–8-celled .. .. *Lasianthus*
- Ovary 2-celled
  - Flowers 2 or 3 together in involucrate cymes .. .. *Thiersia*
  - Flowers solitary, without involucre .. .. .. *Margaritopsis*

* Included in *Psychotria* by Bentham & Hooker.

PÆDERIEÆ.

- Anthers obtuse, dorsi-fixed. Stipules, entire, caducous .. *Pæderia*, inc. *Lygodisodea*
- Anthers mucronate-acute. Stipules bifid, persistent .. *Pæderiopsis*

ANTHOSPERMEÆ.

- Stamens inserted at base, or below middle of corolla-tube.
  - Fruit pyriform, leathery, deeply costate, splitting in 2 cocci *Corynula*
  - Fruit, a succulent berry-like drupe .. .. .. *Nertera*
- Stamens inserted in throat or about middle of corolla-tube.
  - Ovary hispidulous .. .. *Kellogia*
  - Ovary glabrous .. .. *Mitchella*

SPERMACOCEÆ.

- Fruit a 2-locular drupe, neither dehiscing nor separating into cocci (sea-coast, Florida and West Indies) .. .. *Ernodea*
- Fruit dehiscent as a whole.
  - Dehiscence circumsciss.
    - Ovary 2-locular .. .. *Mitracarpum*
    - Ovary 3–4-locular: delicate herbs with minute flowers in small heads interspersed with chaffy bracts; peduncles long, slender .. .. *Perama*
  - Dehiscence longitudinal.
    - Fruit compressed parallel to septum: dehiscence from above downwards. Ericoid shrublets .. .. *Psyllocarpus*
    - Fruit not compressed: dehiscence from below upwards *Staelia*
- Fruit separating into cocci.
  - Cocci quite indehiscent.
    - Cocci more than 2.
      - Disc entire; flowers homostylar .. .. .. *Richardsonia*
      - Disc 4-lobed; flowers heterostylar .. .. .. *Schwendenera*
    - Cocci 2.
      - Cocci leave a persistent axis crowned by calyx; fruit-coat fused with seed .. .. *Crusea*
      - Cocci leave no axis; seed free from fruit-coat ..
        - Calyx-limb 0 .. .. .. *Nodocarpæa*
        - Calyx-limb present .. : .. *Diodia*
  - Cocci open at base .. .. *Hemidiodia*
  - Cocci dehiscent (one only in some *Spermacoce* spp.).
    - Seeds winged .. .. .. *Emmeorhiza*
    - Seeds unwinged .. .. .. *Spermacoce* [including *Borreria*]

GALIEÆ.

- Calyx-lobes of appreciable size, lanceolate .. .. .. *Sherardia*
- Calyx-lobes obsolete.
  - Stipules = small hooked climbing organs .. .. .. *Didymæa*
  - Stipules indistinguishable from the leaves.
    - Flower with involucre (like a calyx) .. .. .. *Relbunium*
    - Flower without involucre.
      - Fruit dry; flower usually 4-merous .. .. .. *Galium*
      - Fruit fleshy; flower usually 5-merous .. .. *Rubia*

WILLIAM SHERARD'S JERSEY PLANTS.

By G. Claridge Druce, M.A.

A question sent me by my friend Mr. T. W. Attenborough, who contemplates, with Mr. S. Guiton, preparing a new edition of the Jersey Flora, induced me to refer to the list of plants from that island which is given as an Appendix to the first edition of Ray's Synopsis (1690). This resulted in finding a first record for Hampshire and probably the earliest record for Britain of *Spergularia media* Presl. (*S. marginata*), which appears to have hitherto escaped notice. Sherard (p. 239) says: "Spergula semine foliaceo nigro, circulo membranaceo albo cincto *Hort. Blæs.* On the shore everywhere. I have found it near Southampton. I know not whether all our Maritimæ be not sem. foliaceo. Yea they are so: and possibly this may be no other than the common maritime Spergula." Sherard was doubtless wrong in referring it to Morison's plant, but we are quite safe in identifying it with *S. media* Presl. It may be recalled that Sherard records a plant which we identify as *Spergula pentandra* (with the same winged membranous margin to the seed) from Ireland, but it has never been verified.* This record much antedates that given by Townsend in the *Flora Hampshire*, and the plant still occurs at Millbrook, near Southampton, where doubtless Sherard saw it.

Babington (Pref. Prim. Fl. Sarn.) somewhat depreciatingly alludes to Sherard's plants; he says "None of them [are] of much interest and all will be found recorded in the following pages." As a matter of fact he gives no reference to the *Spergularia*, has omitted two others, and wrongly identified a third. So far from being of little interest, the list is the earliest evidence for the occurrence in the island of *Gnaphalium luteo-album*, *Helianthemum guttatum*, *Echium plantagineum*, *Scrophularia Scorodonia*, *Asplenium lanceolatum*, *Geranium purpureum*: 'Gramen Alopecuroides spica aspera brevi C.B." (*Cynosurus echinatus*) which is wrongly referred to *Bromus rigidus* in the *Primitiæ*, *Bartsia viscosa* and *Sibthorpia europæa* are also included. This record of the last species is omitted both by Babington and Lester Garland: the plant had only three years before been made known as British by Ray, who in his second edition (1696) adds Sherard's Jersey locality without, however, citing his name for it.

There is some doubt as to the "Gramen Arundinaceum acerosa gluma" which Babington identifies as *Phalaris arundinacea*, since Sherard says "'Tis different from Parkinson's . . . . Mr. Bobert will have it to be the Gram. paniculatum folio variegato C.B., only not strip'd." *P. arundinacea* is not found in Jersey except as the striped Canary Grass, a garden outcast. *Calamagrostis epigeios*, which does occur, was a plant probably well known to Sherard; is it possible that *P. minor*, a very different looking grass, was the one seen?

[* See Journ. Bot. 1890, 302, 343.—Ed. Journ. Bot.]

The list includes a species of *Geaster*, two marine *Algæ*, and "Equisetum sub aqua repens ad genicula polyspermon" which Sir J. E. Smith, doubtless erroneously, identifies as *Chara gracilis*, the only species recently recorded being *C. fragilis*, *C. aspera*, *C. vulgaris* and *Nitella flexilis*.

ON THE NAME *LAMPROTHAMNUS* *Braun*.

By James Groves, F.L.S.

Some years ago Dr. Nordstedt drew our attention to the fact that the name *Lamprothamnus*, given by Alexander Braun to a genus of *Characeæ*, and first published in 1882, in Braun and Nordstedt's *Fragmente einer Monographie der Characeen*, pp. 16 and 100, was then already taken up, having been given by Mr. Hiern to a genus of *Rubiaceæ* published by him in 1877 (Fl. Trop. Africa, iii, p. 130). It has therefore become necessary to rename the genus of *Characeæ*. Acting on a suggestion of Dr. Rendle, that a name should be chosen as near as possible to *Lamprothamnus* while sufficiently distinct to avoid confusion, I now propose the name Lamprothamnium.

The difficulty as regards the nomenclature of this genus unfortunately does not end with the generic name. The single species referred to it is now generally known by the specific name *alopecuroides*, or *alopecuroidea*, first published as *Chara alopecuroidea* by Braun in 1849, in his *Uebersicht der Schweizerischen Characeen*, p. 13, and based on a MS. name of Delile. There are, however, no less than three earlier published names belonging undoubtedly to this species, viz. *Chara papulosa*, Wallroth (1833); *C. Pouzolsii*, Braun (1835); *C. Wallrothii*, Ruprecht (1845).

The first of these names is an unfortunate one. As Dr. Nordstedt has pointed out to me, the papulæ on the internodes of the stem, described by Wallroth, and upon which he based the name, were no part of the plant, but consisted of a separate organism with which it was infested; and Ruprecht, recognising this, renamed the plant *C. Wallrothii*, quoting "*Ch. papulosa* Wallr. 1833 excl. papul." I do not think the name *papulosa* had been used for the plant by anyone but its author until it was quite recently revived under the genus *Lamprothamnus* by Beguinot and Formiggini. The second name—*C. Pouzolsii*—was given by Braun to a form of the plant from Corsica.

It is clear that the name of *alopecuroides* (or *alopecuroidea*) cannot stand if we accept art. 48 of the "International Rules," which prescribes the retention of the earliest specific name when the species is removed to another genus. The question then arises whether or not the earliest name *papulosa*, given as it was under an entire misapprehension, ought to be maintained, and upon this point no doubt there will be a difference of opinion.

There can be no question that, in the circumstances, the name was an entirely inappropriate one, but art. 50 of the "Rules" provides that "no one is authorised to reject, change or modify a name (or combination of names) because it is badly chosen," and reading this article in conjunction with art. 15, there would not seem any option but to retain the name, not the least doubt apparently existing as to the identity of the species intended by it. Against this view, however, it might be urged that the name *papulosa* is more than "badly chosen," that it is such an exceptional case as may have been contemplated by art. 17, and that a change might rightly be made "based on a more profound knowledge of facts."

It does not seem to me that the case against Wallroth's name is sufficiently strong to warrant its rejection, so I reluctantly present the new combination *Lamprothamnium papulosum*.

The synonymy of genus and species stand as follows:—

LAMPROTHAMNIUM, *nom. nov.*

Lamprothamnus Braun, in Braun & Nordst. Fragm. Monogr. Charac. pp. 16, 100 (1882) *non* Hiern.

LAMPROTHAMNIUM PAPULOSUM, *comb. nov.*

Chara papulosa Wallroth, Flor. Crypt. Germ. ii, p. 107 (1833).
C. Pouzolsii Braun, in Flora xviii, i, p. 58 (1835).
C. Wallrothii, Ruprecht, Distr. Crypt. Vasc. Imp. Ross. p. 12, and Symb. ad Hist. Pl. Ross. p. 80 (1845).
C. alopecuroidea Braun, in N. Denks. Schweiz. Ges. Naturw. x, p. 13 (1849).
C. alopecuroides Wallman, Försök. Syst. Uppställ. Charac. p. 53 (1853).
Lychnothamnus alopecuroides (misprinted *alopecoroides*) Braun, in Monatsb. Akad. Berl. for 1867, p. 798 (1868).
L. Wallrothii Wahlstedt, Monogr. Sver. & Norg. Charac. p. 23 (1875).
Lamprothamnus alopecuroides Braun, in Braun & Nordstedt, Fragm. Monogr. Charac. p. 100 (1882).
L. papulosus Beguinot & Formiggini, in Bull. Soc. Bot. Ital. xiv, p. 108 (1908).

SHORT NOTES.

AQUILEGIA ALPINA L. IN SCOTLAND.—In the third week of August this year, when in Caenlochan Glen with my wife and Mr. Druce, I gathered *Aquilegia alpina* L. growing in the crags at an altitude of 2850 feet. It was associated with *Erigeron alpinum*, *Saussurea alpina*, *Cerastium alpinum*, *Veronica alpina*, etc. There were three or four plants in fine flower, several other plants, and many seedlings. Judging from the thickness of the root-stocks, the plants seem to have been established there a very long time. That it has escaped notice hitherto must, I think, be owing to the inaccessibility of the rock ledge on which it grows and the late period of flowering. I saw plants flowering this year on the 11th of September. Caenlochan is a strictly preserved deer forest, and it was only owing to the war that this year access was possible after the beginning of August. When the plant is not in flower the small root-leaves are quite inconspicuous. In Europe the plant is a native of the Alps of Switzerland and Northern Italy. It is absent from the mountains of Scandinavia, hence it is unlikely to be native in Caenlochan. In this Journal for 1885 (p. 26) Mr. Buchanan-White wrote that, unless his memory deceived him, he was told by a horticultural friend that he had sown a quantity of *Myosotis rupicola* along with the seeds of other alpines in Caenlochan; it is possible that *Aquilegia* may have been sown at that time; if so, its persistence for nearly forty years is remarkable. In any case the plant is thoroughly established there, and I think it well to place the fact on record. R. H. Corstorphine.

An Overlooked Paper on Cactaceæ.—In Loudon's *Gardener's Magazine*, xvii, pp. 313–321 (1841) is a "Catalogue of the Cacti in the Collection of the Rev. Theodore Williams, at Hendon Vicarage, Middlesex: by George Lawrence, Gardener there," which seems to have escaped notice. Lawrence, of whom I know nothing further than may be gathered from this paper, had evidently a considerable knowledge of the plants, of which Mr. Williams had a very large collection: his enumeration is on scientific lines, the species being grouped into tribes, the genera divided into sections and subsections, and the species briefly diagnosed. That the paper (of whose scientific value I am unable to express an opinion, though I suspect it to be slight) has been overlooked I assume from the fact that one of the genera—*Echinofossulocactus* (a split from *Echinocactus*) under which are placed 34 named species—finds no place in the *Index Kewensis*. No authorities are appended to any of the names; I have not troubled to ascertain whether any of them are new, contenting myself with calling attention to the paper. James Britten.

Helleborus viridis.—Will someone tell me why Green Hellebore sometimes droops and fades within an hour if put into water and kept in an ordinary room, but remains fresh for a week in a tin? Some similar specimens have kept tolerably fresh fourteen days in a tin. Though usually the drooping is less marked, of course the phenomenon can be seen in certain other flowering plants, and this is one of the reasons for not putting them in water if intended for the press. H. S. Thompson.

Matricaria suaveolens Willd.—I have this year found this plant in three localities—Woodberrie Hill, Loughton, Essex, in abundance; Gravel Hill, Ludlow, Salop; and near the sea at Bray, Co. Wicklow—in small quantity in both places. I have a distinct recollection of having found it either at Kew Bridge or near Wandsworth steamboat pier in 1862–3, although it does not appear in either of my lists for those places published in Journ. Bot. 1863, 376, and *Phytologist*, n.s. vi, 411: I fear I then regarded it as a rayless form of *Anthemis Cotula*.

James Britten

Androsace ciliata in the Alps: a Correction.—I sent to my friend M. G. Beauverd, keeper of the Herbier Boissier, a specimen of the *Androsace* from the Grands Mulets which originally I had named *A. glacialis* Hoppe (= *alpina* Lam.), but which recently I had determined as *A. ciliata* (see p. 111)—a determination confirmed by Mr. Bucknall. M. Beauverd informs me that Dr. Buser and he consider my plant × *Androsace Ebneri* = × *A. aretioides* Kerner = *A. alpina* × *obtusifolia* R. Knuth in Pax ex Knuth, Pflanzenreich 22, *Primulaceæ*, p. 219 (1905). He adds that this hybrid, which I do not find in any book I possess, has long been known and is widely spread in the Pennine Alps; and that he himself has gathered fine examples from the Col de Fenêtre and this year from the Gornergrat.

H. S. Thompson.

Folk-lore of the Tormentil.—The following is taken from the note on "The Folk-lore of London," issued in connection with the special exhibition of medical charms, etc., collected in London, now on view at the Wellcome Historical Medical Museum, 54a, Wigmore Street, W. Acorns also figure in the collection, both singly and in necklace form, being worn—no doubt on account of their astringent properties—as a remedy against diarrhœa. Mr. Edward Lovett, who has lent the collection, was told by a herbalist that "two girls came to his shop and asked whether he could let them have a pennyworth of Tormentilla root. He gave it to them, but they would not tell him why they wanted it. After about a week they returned for some more. He would not let them have it till they had told him what they were going to do with it, and finally they confessed that the 'young man' of one of them had ceased to be a lover, and, acting on the advice of a 'wise woman,' they were going to burn the root on a Friday midnight, in order to make the lover so miserable that he would return to the love he had forsaken."

REVIEWS.

The Genus Phoradendron: a Monographic Revision. By William Trelease, Professor of Botany in the University of Illinois. Urbana, Illinois: Published by the University, 1916. 4to, cloth, pp. 224, 245 plates. Price not stated.

In this weighty volume—we employ the adjective in its literal sense, for the book scales nearly five pounds—we have the result of many years' labour on the part of Professor Trelease, who in the course of its preparation has visited all the great herbaria of Europe, and has thus been able to bring to completion a monograph which he had already undertaken so far as the North American species of *Phoradendron* were concerned. The importance of the volume may be estimated from the fact that the author found, "when casting [his] results into classified form, that on an average nearly two new named forms appeared for each one already admitted to our northern flora." The number of novelties is to some extent due to "the great conservatism of Engelmann," which "had not only caused him to withdraw segregates of *P. flavescens* that he admitted at one time, but had reacted on his early colleague Torrey, to the extent of causing a number of mistletoes which had been designated in the Torrey herbarium as new species to lie there, as they still do, without publication."

The material now contained in the great herbaria shows a total of 277 "differentiable forms," of which 240 are regarded as species: of these 66, or 23 per cent., are represented in the north, and 211, or 77 per cent., in the equatorial region. Professor Trelease regards these, which he terms respectively Boreales and Æquatoriales, as "two primary groups, respectively constantly without and with cataphyls on their foliage shoots"; "of the Boreales 41, or two-thirds, and of the Æquatoriales 87, or two-fifths, are now characterised as new." The introduction, from which we take this information, includes also an analysis of characters, and a note on nomenclature, from which we learn that "the American principle 'once a synonym always a synonym'" has been followed: those who follow the general practice in this matter must therefore not accept Professor Trelease's names without investigating their claims to adoption.

It is obvious that only those intimately acquainted with the genus could competently criticize the treatment of the species: the present writer has no such qualification, and must therefore content himself with saying that the descriptions are evidently drawn up with great care, and that the enumeration of the specimens examined, sometimes extending to a whole page, shows that the author has had at his disposal a vast amount of material. A clavis is given to the species of each section; there is a full synonymy of the older species; there is a complete index, collectors' numbers with identifications, and an index of excluded species and of names: in the latter we think it would have been useful had the novelties been indicated by an asterisk, and had the principal reference been printed in black type. It would also have greatly added to the convenience of those engaged in herbaria had each species received a number—as it is, those who arrange the genus by the monograph will have to add this for themselves.

It remains to say a word about the plates, all of which are reproduced from photographs, when possible from types. "Every species has been figured, and scarcely a half-dozen types, even of synonyms, are unpictured": this has been rendered possible by the co-operation of those in whose charge the types are placed, to whom Professor Trelease expresses grateful acknowledgement; 237, or nine-tenths of the recognized forms, are now figured for the first time.

It is impossible to conclude the notice of this important volume without a feeling of envy of our transatlantic colleagues in the privileges which fall to their lot: the opportunity of spending a year in the great herbaria of Europe, which is we believe an ordinary feature in professorial life, has no counterpart over here, nor would it be easy to find a university which would issue as one of its publications a large and costly monograph which, from its nature, is hardly likely to be remunerative. But perhaps the admirable results of these opportunities, by which the botanists of the world benefit, call for congratulation rather than envy.

A Glossary of Botanic Terms with their Derivation and Accent. By BENJAMIN DAYDON JACKSON, Knight of the Polar Star, Hon.Ph.D.(Upsal.), General Secretary of the Linnean Society of London. Third Edition, revised and enlarged. London: Duckworth & Co. 8vo, cloth, pp. xii, 428. Price 7*s*. 6*d*. net.

THE earlier editions of this most useful work, appearing respectively in 1900 and 1905, were duly noticed in the volumes of this Journal for those years. All that was said in their praise may be repeated as to the present edition, which has indeed for some time been wanted, the delay in its preparation having been "entirely due to pressure of occupation." The volume has been entirely reset, so that the supplement to the second edition is now incorporated in the text, to the great advantage of those using the book. Dr. Jackson tells us that he has carefully considered the criticisms which have come under his notice, and has adopted all which could be taken up, "so far as they did not contradict the plan on which this volume was drawn," but he indicates that not all the criticisms have been of a useful nature. He has "tried to furnish the terms in use in various periods, so that a paper or book of any period can be read and understood": in this he has been successful, and we are glad that he has not attempted to cut down the volume—a suggestion which seems to have been made.

The total number of terms included amounts to nearly 21,000, as against about 16,000 in the second edition—"if the various meanings were added, they would amount to about 1,200 more." The number of pages is increased from 371 to 428, but the difference of paper employed has reduced the bulk of the volume to a more convenient size.

We are sorry that the publishers retain the practice—long since abandoned, if ever adopted, by the best houses—of disfiguring the title-page of review copies with a die in violet ink.

A Manual of Mendelism. By JAMES WILSON, M.A., B.Sc. A. & C. Black, Ltd. Pp. 152. 1*s*. net.

THIS book is one of those, unhappily too rare in these days, which appeal straightway to the eyes and to the touch. Neatly bound in dark, smooth cloth, admirably printed, abounding from cover to cover in lucid-looking, lavishly-spaced, diagrammatic tables, and amazingly cheap, this Manual invites the attention of every reader. The title is, perhaps, a little imposing for so small a work; and after reading three or four chapters one begins to feel that the book should have been either much larger, so as to justify its title, or, better still, much more elementary. Mendelism, we know, involves mathematics; but Mr. Wilson has given us too much mathematics; and we look askance at the dedication to a former mathematical teacher. Nevertheless the author has made this mathematical side as attractive as possible, and as clear, perhaps, as possible. But this has been done at the expense of the more interesting side of the subject, especially the historical side. The introductory chapters are too short; Mr. Wilson, evidently a master of his subject, has shown little sympathy with the general reader; and to the expert he must appear one-sided.

Again, too little concession has been made to the botanist; *Œnothera* is not even mentioned; the horticulturist feels somewhat lost in this maze of poultry and cattle, milk and eggs; while the cattle-breeder and poultry-farmer would look with awe, if not suspicion, on these figures, algebraic signs, and squared-paper diagrams.

In fact, the book will only appeal to a small circle, namely, that of the specialist in the study of heredity. Mendelism, surely, is a subject of fascinating interest; and this Manual leaves the general reader cold, disappointed of the promise raised by its first appearance. H. F. W.

Illustrations of the British Flora: a Series of Wood Engravings with Dissections, of British Plants, drawn by W. H. Fitch, F.L.S., with additions by W. G. Smith, F.L.S. Fourth Revised Edition. 8vo, cloth, pp. xvi, 338, 1335 figures. Lovell Reeve & Co. Price 9*s*. net.

This new edition of the useful and handy volume which was prepared as a companion to Bentham's *Handbook of the British Flora* contains certain features which differentiate it from previous issues and entitle it to rank as an edition. The anonymous editor has added the key to the arrangement of the orders, now somewhat antiquated, from the *Handbook*, with other introductory matter; a certain amount of synonymy is added, thus rendering the book a useful companion to other floras, as well as English names, real and manufactured: of the latter "Holly-leaved Naiad" for *Naias marina* and "Long-bracted Carex" for *Carex extensa* may be taken as examples of names which no one has ever used nor will use. The contraction of the specific names in synonymy is justified on the ground of limitation of space, but in many cases there is room for them in full—"*Juncoides ar.*" and "*Obione po.*" for example. The colour of the flowers is indicated with somewhat startling results: it will be news to most that *Trifolium arvense*, *T. stellatum* and *T. ochroleucum* have crimson flowers, although the last is

Englished "Sulphur Clover." The names are very carelessly printed—turning over the pages we note "Solidag*a*" (p. 126), "Petroselinum sa*l*ivum" (p. 103), "Pilularia lobulifera" (p. 316), "Anacharis Alsi*m*astrum" (p. 244), "Orchis m*u*scula" (p. 250), "Hippoph*æ*" (p. 221), "B*r*aksedge" (twice, p. 272). The figures are in most cases excellent, but no attempt has been made to show the not inconsiderable additions to our Flora which have been made since the last edition of the book was published. There is an excellent index, but the general impression left by the book is that if it was worth doing (as it was) it should have been done better.

BOOK NOTES, NEWS, &c.

The *Journal of Genetics* issued in September (vol. vi, no. 1) is entirely devoted to two papers by Prof. A. H. Trow—"On the Number of Nodes and their distribution along the main axis in *Senecio vulgaris* and its segregates," and on "Albinism" in the same plant. Prof. Trow has already published elaborate researches into the life-history of this common weed; in the first of these papers—which is accompanied by a number of tables, showing results obtained—he sums up the results of some years' observation on the "habit" character mentioned in its title—a character for the study of which the Groundsel is especially adapted.

The *New Phytologist* for May–June (published July 24th) contains an interesting paper, illustrated by plate and text-figures, by Miss Elizabeth Acton, M.Sc., "On a New Penetrating Alga" (*Gomontia Ægagropilæ*), which appeared in an ordinary white pie-dish in the laboratory of University College, Reading. The dish contained "Cladophora balls" collected a few years previously from Loch Kildona, in South Uist: "pale green patches suddenly began to form on the sides and floor of the dish which proved to be the plant named," which also covered many of the dead cells of the *Cladophora*. In the same number Mr. W. J. Hodgetts figures and describes *Dicranochæte reniformis* Hiron., a species new to Britain, found last April on the submerged stems and leaves of *Ranunculus aquatilis* and a *Callitriche* from a small pond at Harborne, near Birmingham. The only other species of the genus so far known is *D. britannica* G. S. West, described and figured in this Journal for 1912, p. 329.

Our rubbish-heap flora has received an addition in *Stipa Neesiana* Trin., which has been found and still exists as "a fine vigorous clump, at Mortlake; there is "a dust destructor close by where hides are frequently destroyed; we may infer that spikelets attached to hides, probably from the Argentine, were introduced with them, became detached somehow, and finally found their way" to the place where the plant now occurs. The plant—a native of South America—had occurred previously at Port Juvénal, "the classical collecting ground of aliens near Montpellier, of which, and of the plant, Dr. Stapf gives an interesting account in No. 8 of the Kew *Bulletin* for the current year.

A writer in *The Selborne Magazine* for October has recently discovered the *List of British Seed Plants*, with somewhat amusing results. She suggests that "those who have not yet corrected their Bentham [by this *List*] should at once proceed to do so"; this we fear would not be as easy as the writer seems to suppose; moreover the *List* itself now stands in need of correction. "Some of the [altered names] are rather overpowering: with the present tendency to clip and contract all long words, shall we reconcile ourselves easily to call our Water-cress *Radicula nasturtium aquatica* (*sic*) and so on. She seems to have an odd notion of the principles which govern nomenclature. "Can we learn to accept the Red Valerian as *Kentranthus*—and *Blackstonia*, for the Yellow-Wort, is certainly less euphonious than *Chlora*; *Juniperus siberica* (*sic*) and *Ammophila baltica* we welcome, the altered specific throwing light on the plant's geographical distribution." The rest of the note is on similar lines.

The twentieth annual fungus foray of the British Mycological Society was held at Lyndhurst in the New Forest, on September 25–30. The excursions were all in the neighbourhood of headquarters. Many rare fungi were noted, the larger species of *Clavaria* being particularly well represented. In the absence of of the president, Mr. E. W. Swanton, the chair was taken by the immediate past president, Mrs. Rea. Miss A. Lorrain Smith was elected president for next year and Miss G. Lister and Mr. Rea were re-elected respectively as vice-president and secretary and treasurer. It is satisfactory that the affairs of the Society should be in such experienced hands at such a time as this, as it is essential that its work, which has so many economic applications, should be carried on with vigour. Mr. Swanton's presidential address was on "Education in Mycology," and dealt with the efforts made in our Colonies and in various countries to spread the knowledge of fungi. Dr. W. I. Elliott described some observations on the plasmodium of *Badhamia*. Dr. Somerville Hastings gave an account of the eating of fungi by rodents, slugs, etc., and Mr. J. Ramsbottom read a paper on "Education in Plant Pathology." This paper, which was a contribution to a discussion at the British Association, dealt with the lack of proper training of plant pathologists and insisted on the necessity of such training: the writer suggested that the universities might issue diplomas in economic mycology, and that a central laboratory and experimental station should be instituted for research and for the final training of men who were to take up pathological posts. Mr. Ramsbottom also read a paper on the history of the Ustilaginales, tracing this from Theophrastus to the present day. The foray in 1917 will be held at Shrewsbury.

WILLIAM ANDERSON (†1778) AND THE PLANTS OF COOK'S THIRD VOYAGE.

By James Britten, F.L.S.

The history of the plants collected by Banks and Solander during Cook's first voyage (1768–71) and by J. R. and G. Forster during the second (1772–75) is sufficiently well known; but I do not think any account has been given of those obtained during the third voyage (1776–79). The collections then made were comparatively small, and the additions to our knowledge of the botany of the regions visited relatively unimportant; yet the specimens obtained, which, like those of the earlier voyages, are in the Department of Botany of the British Museum, present certain features of interest which may as well be placed on record. The opportunity may also be taken to pay a tribute, too long delayed,* to William Anderson, to whom Cook was indebted in great part for the information contained in vols. i and ii of the account of this *Voyage to the Pacific Ocean* (1784), and to whom we owe all that was known of the flora of Kerguelen's Land, prior to the visit of the Antarctic expedition in 1840.†

I.—William Anderson.

Of the early life of Anderson we know nothing; he was almost certainly a Scotchman and educated in Edinburgh, but does not seem to have taken a degree. The earliest reference we have to him is that by Cook (*op. cit.*, i, 4):

"Mr. Anderson, my surgeon, who to skill in his immediate profession added great proficiency in natural history, was as willing as he was well qualified to describe everything in that branch of science which should occur worthy of notice. As he had already visited the South Sea Islands in the same ship [the *Resolution*], and been of singular service, by enabling me to enrich my relation of that voyage with various useful remarks on men and things, I reasonably expected to derive considerable assistance from him in recording our new proceedings." A footnote states that the Otaheitan vocabulary and linguistic tables contained in the account of the second voyage were furnished by Anderson, who thus began the series of observations which he later carried on with so much success. On this voyage he occupied the position of surgeon's mate, but his name does not appear in the lists of those on either ship, nor do I find it mentioned, even incidentally, in the volumes containing the account of the voyage, and it is absent from J. R. Forster's *Observations made during the Voyage* (1778). The notes made by Anderson on the birds observed during the voyage will be referred to later; it would appear that he collected plants, for Solander, who visited the

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* In so saying I am not overlooking Dr. Daydon Jackson's brief but appreciative notice in Dict. Nat. Biogr. i, 393.

† J. D. Hooker, *Fl. Antarctica*, ii, 223.

Resolution on its return, writes to Banks (August 14th, 1775): "I was told that Mr. Anderson, one of the surgeon's mates, has made a good botanical collection, but I did not see him." This letter and that which precedes it contain much of interest; they are in vol. i of the transcription of Banks's correspondence in the Department of Botany.

In the winter preceding the third voyage* Anderson was in London, where he made the acquaintance of Sir John Pringle, then President of the Royal Society, and communicated to him notes he had taken during the second voyage "of the cases of some of our ship's company, who, on our late voyage to the South Sea, had experienced the bad effects of eating certain fish of a poisonous nature." These notes, taken in July, 1774, "on board His Majesty's ship the *Resolution*, off the Island Malicolo, in the South Sea," are published in Phil. Trans. lxvi, 544–552; they are dated: "*Resolution*, Deptford, April 23, 1776," at which time the ship, to which he was attached, was in the river, laying in stores, ammunition, etc. From the note which introduces them we learn that Anderson had been "favoured by Mr. Banks with a sight of his drawings," which enabled him to identify the fish as *Sparus Pagrus* L. In a later volume of the *Transactions* (lxviii, 102) we find Anderson at the Cape, writing to Pringle under date November 24th, 1776, "an Account of a large Stone near Cape Town" which he had been taken to see by Francis Masson, whose acquaintance he had there made—probably through Pringle, through whose good offices Masson had been sent to the Cape (see Journ. Bot. 1884, 115–6).

On the same day Anderson wrote a long letter to Banks, of which there is a transcript in the Banksian correspondence at Kew. In this he speaks of the arrival of the *Discovery* with "a person in her who understands Botany" who "will be able to procure you every new article in that branch, a task which I have not vanity enough to suppose myself equal to; but shall nevertheless continue to collect whatever presents itself, lest any accident should happen either to him or to the ship. We carried him with us to the country, but unluckily at the time few plants were in flower; yet when such things offer I think his diligence will let few of them escape." This "person" was doubtless David Nelson, of whom some particulars will be given later. Anderson proceeds to give a short account of the voyage out. At Teneriffe, "in the valley which I ascended and on the sides of the hills not a plant was to be seen but the *Euphorbia canariensis*, which grows in vast quantities. It is astonishing to see with what luxuriance this large succulent plant grows on the barren rocks, and though to all appearances useless serves the inhabitants, who break it down and let it dry in the sun, for fuel."

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* Webber, the "professed and skilled artist" who was engaged by Cook to accompany him, and from whose drawings the plates accompanying the account of the voyage were taken, seems to have been subsequently employed by Banks. In the collection of Masson's drawings are two by him—one is labelled by Dryander, "Webber, copied from a drawing of Captain Gordon's at the Cape of Good Hope" (=*Pachypodium namaquanum*); the other, an incomplete one of *Stapelia* (*Hoodia*) *Gordoni*, is merely labelled "Webber," but was doubtless also a copy, probably also from Gordon, of whom an account will be found in Journ. Bot. 1914, 75, 224.

During the third voyage Anderson kept a journal, of which extensive use is made in the published account. At his death it would naturally have come into the hands of Cook, after whose murder, or at any rate before the publication of the *Voyage to the Pacific*, it was probably acquired by James King, a lieutenant with Cook on the *Resolution*. Whether the copious extracts from Anderson's journal were inserted by Cook or added by King, who wrote the third volume and probably prepared the first two for press, cannot be ascertained; but it is not too much to say that, apart from their relation to geographical discovery, the value of these volumes is mainly due to Anderson's observations. These extend to anthropology and to every branch of natural history, as well as to folk-lore and philology, and are among the earliest contributions to our knowlege of these subjects in the region to which they relate. Anderson's help is not only frequently acknowledged in general terms, but extracts extending over many pages and occasionally to whole chapters are taken from his journal, sometimes in substitution for Cook's own account. The journal was kept up to June 3rd, 1778; his death took place on July 3rd, and is thus recorded by Cook (*Voyage*, ii, 440):

"Mr. Anderson, my surgeon, who had been lingering under a consumption for more than twelve months, expired between three and four this afternoon. He was a sensible young man, an agreeable companion, well skilled in his own profession; and had acquired considerable knowledge in other branches of science. The reader of this Journal will have observed how useful an assistant I had found him in the course of the voyage; and had it pleased God to have spared his life, the Public, I make no doubt, might have received from him such communications on various parts of the natural history of the several places we visited, as would have abundantly shown that he was not unworthy of this commendation. Soon after he had breathed his last, land was seen to the Westward, twelve leagues distant. It was supposed to be an island; and, to perpetuate the memory of the deceased, for whom I had a very great regard, I named it Anderson's Island."

This notice of a remarkable man may be concluded by quoting the tribute of Robert Brown when establishing (Prodr. 553) the genus which bears his name:

"ANDERSONIA . . . In memoriam dixi Gulielmi Anderson, chirurgi navalis, qui Cookii expeditionibus bis adjunctus, in ultimâ obiit; hominum et animalium observationi quamvis potissimum deditus, botanicem minimè neglexit, et illius plures descriptiones plantarum, præcipuè Insulæ Diemen, in codic. mss. (in Bibliothecâ Banksianâ asservatis et in ejusdem catal. bis memoratis, tom. 2, p. 32, et tom. 3, p. 184) extant, ubi genera nonnulla tunc inedita proposita invenio, scil. *Goodeniam* Sm. (*Collema* mss.); *Corream*

Sm. (*Euphocarpus* mss.); *Baueram* (*Ramsaia* mss.); et *Eucalyptum* L'Hérit. (*Aromadendrum* mss.)."

There remain for consideration the MSS. in Anderson's hand which came into the possession of Banks, and are now in the British Museum (Nat. Hist.). These originally formed one small quarto volume in the Department of Zoology, but were separated in 1898, the botanical portion being then transferred to the Department of Botany, where it remains. The descriptions must have been taken during the voyage, as Anderson died before its completion, but many were transcribed and amplified after the first description.

The portion containing the Zoology is interesting as giving the only record of Anderson's observations during the second voyage: the first part of this is entitled "Characteres breves Avium (in itinere nostro circum orbe visa) adhuc incognitorum anni 1772, 1773, 1774, 1775": it consists of thirteen small quarto pages, and enumerates and diagnoses birds mostly from New Zealand and New Caledonia, with some from the Cape, the Sandwich Islands, and Terra del Fuego. This is followed by "Zoologia nova seu Characteres & Historia Animalium hactenus incognitorum qui in itinere nostro videbantur 1776 in linguis Latinis & Anglicis traditus. W. A." In this, animals, birds, lizards, fishes, and insects are described, mostly from the above localities, but including birds from Kerguelen's Land. It is evident that on this, as on other early voyages, special attention was paid to ornithology: Sydney Parkinson's drawings, taken during Cook's first voyage, those by George Forster on the second, and those of William W. Ellis, Anderson's companion on the third, are in the Natural History Museum, and the correlation of these last with Anderson's MS descriptions would probably lead to the identification of many of the latter. An enumeration of the drawings of the three voyages, with identifications, by Bowdler Sharpe, will be found in the *History of the Collections*, ii, 172-208. On the last page, under *Tatare æquinoctialis*, we read: "Latham described this bird (Gen. Syn. Suppl. i, 187) from the papers of Mr. Anderson." A reference to Latham (*l. c.*) shows that both this and the description of a bird from Van Diemen's Land which immediately precedes it are adapted from the MSS. under notice: in the latter case Latham (*Index Ornithologicus*, ii, 553) adopts Anderson's trivial for the bird, which he named *Sylvia canescens*.

II.—PLANTS COLLECTED BY ANDERSON.

The volume of Anderson's MSS. devoted to plants contains forty pages; it is in two parts, each with a title-page. The first runs, "Genera nova Plantarum seu Descriptiones characterum naturalium Plantarum adhuc incognitarum in itinere nostro visa —1776, 1777—in Linguis Latinis et Anglicis scriptis, W.A."; the second contains the "Descriptiones seu Characteres specificos." As in the zoological portion, many of the full and careful descriptions, which include plants from the regions already mentioned, appear twice, in the original and in a revised form. They show that Anderson was as proficient in botany as in zoology; the names he bestowed upon new genera and species and their explanations prove him to have been versed in Greek as well as in Latin. He seems to have been well acquainted with the botanical literature of the period, for, so far as they have been identified, the plants which he indicated as "genera nova" generally merited that definition. It does not seem desirable to cite names which have not been published, but some of them have found their way into print, and the history of these may be given.

The first writer to call attention to Anderson's plants, apart from Dryander's reference to his MSS. in Bibl. Banks., was Robert Brown, in his dedication of *Andersonia* already quoted. The names there cited have escaped the notice of the *Index Kewensis*; this quotes three out of the four from later publications which themselves doubtless followed Brown, as [illegible]on's MSS. can hardly have been consulted by their compilers. The four —*Aromadendrum*, *Collema*, *Euphocarpus*, and *Ramsaia* (= respectively *Eucalyptus* L'Hérit., *Goodenia* Sm., *Correa* Sm., and *Bauera* Banks ex Andr.)—should all stand in Ind. Kew. as "R. Br. Prodr. 553," thus superseding the later references; and "W." should be prefixed to the author's name. It will be noted that in each case Anderson's names anticipated those now adopted. *Aromadendron* is identified by Dryander with *Eucalyptus obliqua*, the species which was the type of L'Héritier's genus (Sert. Angl. t. 20, p. 18), founded on material from Anderson and Nelson. Specimens from the latter are in Herb. Banks., and we have a specimen with Anderson's label from Robert Brown's herbarium, acquired later (1876). Of the name Anderson says: "Aromadendron eum vocavi, quia folia fructusimo (partes omnes) aromatici sunt. . . . Habitat in Terra Diemens, cum pars magnus sylvarum format. Folia, flores, fructus, cortex ramulorumque, sapor aromaticus subcalidua (Mentha piperitis similis) gaudent. Truncus etiam resina (s. gumma) rubella astringens reddit." Of *Ramsaia* Anderson says: "I call'd it *Ramsaia* in honour of Dr. Ramsay, Professor of Natural History in the University of Edinburgh"; this suggests that Anderson was an alumnus of that University. He also dedicated a genus to Cook—"a Commendatorio nostro, Navigator et Mathematicus expertus, quia sub navigationibus ejus Genera multa nova Plantarum ad Angliam lati fuerunt."

Two more of Anderson's genera are taken up by J. D. Hooker in *Flora Antarctica* ii (1845): *Sphærula*—which had already been named *Ancistrum inerme* by Dryander in Herb. Banks, as quoted by Hooker—is placed under *Acæna affinis* Hook f. (p. 268); of this Dryander has a full description in the Solander MSS. founded on specimens from "Anderson": I am inclined to think that this is a slip for Nelson, who collected on the same voyage, and to whose specimens the name is applied in Herb. Banks. The other is *Pringlea* (p. 238), which is universally maintained. This Anderson first named *Diaphoranthus*, but later substituted "*Pringlia* (*sic*), from Sir John Pringle, Physician to the Queen and President of the Royal Society," with whom, as we have seen, Anderson was personally acquainted. Of this there are two full descriptions; the translation of the note appended to the latter runs: "The Habit, and acrid watery taste of the plant, agrees with the others of the fourteenth Class [Tetradynamia] ; but it differs from all by having no Corolla, and the Stamina being equal. It is therefore a new Genus, belonging rather to the fourteenth than the sixth Class. It is found on Kerguelens Land, Lat. 48 S. Long. 69 E."

It is remarkable that a plant so obviously distinct should have remained unknown and unnoticed for so long a period, as it was not until 1845 that J. D. Hooker published the elaborate account of it (Fl. Antarct. ii, 238–40) based upon specimens collected by himself of "perhaps the most interesting plant procured during the whole of the voyage performed in the Antarctic Seas." Brown directed his attention to Anderson's MSS. (from which Hooker cites both names—*Diaphoranthus* and *Pringlea*—adopting the latter) and suggested the specific name *antiscorbutica*, ignoring one which Anderson had given it. It may be noted that Hooker says the plant was discovered by Cook during his *first* voyage; it was, however, during the *third* voyage that it was found by Anderson, whose account of the vegetation of what Cook thought would be more appropriately called "the Island of Desolation" (which includes a description of *Pringlea*), will be found in *Voyage to Pacific Ocean*, i, 84. Pringle's "work on scurvy," to which Hooker refers, is the "Discourse upon some late Improvements of the Means for Preserving the Health of Mariners," which, as President, he delivered at the Royal Society at its anniversary meeting, November 30th, 1776, on the occasion of presenting the Copley Medal to Cook; it is appended to Cook's account of his second voyage (ii, 369–396).

The reason for the neglect of *Pringlea* is doubtless to be found in the fact that Anderson's specimens were not incorporated in the Banksian Herbarium, and thus did not come under the critical examination of either Solander or Dryander, although the former, at any rate, had inspected them. The bundle containing them seems to have been lost sight of until Hooker, in 1843, examined it for his *Flora Antarctica*, at which period he tells us that "not having been poisoned, all the Kerguelen plants were much injured by insects, and many were entirely destroyed" (Phil. Trans. extra volume, 1868, p. 9). Excellent specimens, however, remained of a grass which he described (Fl. Antarct. i, 382) as *Festuca Cookii*, basing his description upon Anderson's specimens and his own; later (Phil. Trans. 1868, p. 41) he referred the species to *Poa*, in which it had been placed by Solander when he looked through the bundle. Shortly after I came to the Department of Botany (1871) I went through the bundle and found these specimens, with a note by Solander—"Hab. Paludosa"—and those of *Pringlea* already mentioned—the latter in bad condition, but sufficiently entire to allow of their incorporation in the herbarium. These were accompanied by a ticket in Anderson's hand with the name *Diaphoranthus* and a reference to his MSS. It is this name which the plant bears in Brown's MS.* description, which includes an account of the seeds which had been given him by Dickson, "a D. Evans vigniti circiter abhinc annis a Terra Kerguelin recepta." Brown probably had specimens from Anderson's collection, as we know to have been the case with *Aromadendron* already mentioned; we also have from Brown's herbarium a specimen of Anderson's *Euphocarpus* (*Correa alba* Andr.) named by him. The Banksian herbarium contains specimens endorsed by Dryander, "Van Diemen's Land, W^m Anderson and Dav. Nelson," and by whom the species is dedicated to Anderson.

III.—Plants collected by David Nelson.

The botany of the Voyage is more fully represented in the National Herbarium by the plants obtained by David Nelson, a Kew gardener who was sent by Banks to collect for him. This we learn from the transcript of Banks's correspondence in the Department of Botany (vol. v. f. 146), where, in a memorandum recommending Nelson for the post of collector on Bligh's voyage to the West Indies (1787), Banks writes (March 30th, 1787) that Nelson "sailed with Captain Cook on his third voyage round the world in my service for the purpose of collecting plants and seeds, and was eminently successful in the object of his mission: he had been regularly educated as a gardiner (*sic*) and learned there the art of taking care of plants at sea, and guarding against the many accidents to which they are liable, which few people but himself have had any opportunity to know practically: he learned also how to conduct himself on board a ship, and made an acquaintance with inhabitants of the South Sea Islands and their language, which will in all probability facilitate his obtaining the number of plants wanted, a matter in which, as the Indians have never been accustomed to sell them, and a large number will be wanted, difficulties may arise." Occasional references to Nelson as a collector will be found in Cook's *Journal of the Voyage.*

No list of Nelson's plants has been preserved, but they are referred to incidentally in the publications of botanists who have consulted the Banksian Herbarium, through which they are distributed, and they are also cited in the Solander MSS. Bretschneider (Hist. Eur. Bot. Disc. 153) gives a list of eleven Chinese species collected by Nelson, compiled from various sources, several of which are cited in the *Index Floræ Sinensis* as being found in the Herbarium; these were collected at Canton and Macao on the return of the expedition in December, 1779. Nelson's Sandwich Island plants are cited in the *Flora Vitiensis*, and his Australian specimens are also in the Herbarium: his Adventure Bay plants are referred to by J. D. Hooker (Fl. Tasm. i, p. cxiii). Brown in dedicating to him the genus *Nelsonia* (Prodr. 481) speaks of him as "hortulanus meritissimus, qui in ultimo itinere Cookii plurimas novas species plantarum ldetexit"; and Smith (in Rees Cyclop.) styles him "an excellent gardener and good practical botanist, who was sent out with Captain Cook in his last voyage, and discovered many new plants, for which we have in several places had occasion to mention him." J. A. Murray (in Comm. Ref. Scient. Gotting. vi, 30, 1785) describes and figures *Rhus semialatum*, which he raised in the Goettingen garden from seeds collected by Nelson in Macao that had been sent him by Banks; the description is preceded by a long note from which it appears that Nelson collected seeds at all the places where the ship stopped, and that over two hundred of these were sent by Banks to Goettingen. There are also in the Herbarium specimens collected by Nelson at the Cape on the outward voyage (1777); these were doubtless obtained on the walks he took with William Anderson, whom he joined at the Cape (see p. 346).

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* I do not think it is generally known that the Department of Botany contains a very large series of Brown's MS. descriptions, corresponding in *format* with the Solander MSS. and arranged systematically in Solander cases.

Nelson's position in connection with the voyage of the *Bounty* has already been stated; as is generally known, it was terminated by his death on the island of Timor. It may be worth while to reprint from Bligh's *Voyage to the South Seas* (pp. 239, 240) the passages which relate to him. On arriving at Coupang in 1779, Bligh writes that he had obtained permission for Nelson "to walk about the country in search of plants": this was readily granted, but "from this indulgence I derived no benefit; for Nelson, who since we left New Holland had been but in a weak condition, about this time was taken ill, in consequence of a cold caused by imprudently leaving off warm clothing.* . . . On the 20th of July, I had the misfortune to lose Mr. David Nelson; he died of inflammatory fever. The loss of this honest man I very much lamented: he had, with great care and diligence, attended to the object for which he was sent, and had always been ready to forward every plan that was proposed for the good of the service in which we were engaged. He was not less useful on our voyage hither, in the course of which he gave me great satisfaction by the patience and fortitude with which he conducted himself." A description follows of his funeral, which took place next day and was attended by the crew and representatives of the town.

MISCELLANEA BRYOLOGICA.—V.

By H. N. Dixon, M.A., F.L.S.

(Continued from Journ. Bot. 1915, p. 23.)

Aërobryum lanosum Mitt.

Mitten in Musc. Ind. Or. (Journ. Linn. Soc. 1859, Suppl. p. 90) described a Sikkim moss (J. D. Hooker, No. 884) as *Meteorium*

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* The statement in Kew Bull. (1891, p. 297) that he "died from the long exposure" consequent on his being "set adrift by the mutinous crew" would thus seem to be inaccurate.

lanosum, adding as further localities Ceylon, *Gardner*; Hong-kong, *Bowring*; and the Pacific Is. Subsequently he referred it to *Aërobryum*, and it has been more recently placed by Brotherus in *Aërobryopsis*.

A good deal of ingenuity has been expended since that time in seeking to elucidate the differences between this and the well-known, wide-spread, and highly variable *Aërbroyopsis longissima* (Doz. & Molk.) Fleisch. Thus Brotherus separates the two species by vegetative characters, assigning to *A. lanosa* certain distinguishing features ("etwas starre, mit flach beblätterten Ästschen; Blätter an der Spitze nicht oder kaum querrunzelig") which are neither attributed by Mitten to his plant nor borne out by his specimens. Again, Fleischer, in *Musci . . . . von Buitenzorg*, iii, 786, gives some characters of his own (one of which is directly at variance with that given by Brotherus), and adds characters drawn from the peristome which, whatever their value, could not be considered as specific characters of Mitten's type, since none of the specimens cited by him were fruiting. Paris retains both species, but the synonymy he gives only adds, if possible, to the confusion.

All this ingenuity is, I am convinced, misplaced. Mitten never intended to separate his plants from *A. longissima* at all, as will be evident by a study of what he writes on the subject. In Musc. Ind. Or. he makes no reference to the *Meteorium longissimum* Doz. & Molk. of the Musc. frond. ined. Archip. ind. This does not mean that he considered his plant distinct; it is far more likely that he overlooked the resemblance (or identity) of the two. Had *M. longissimum* been before him he could hardly have failed to compare his plants with that, rather than, as he does, with *M. auronitens* and *M. filamentosum*, neither of which certainly resembles his *M. lanosum* so closely.

In his list of Samoan Mosses (Journ. Linn. Soc., 1868, p. 170) Mitten records his species from Tutuila thus: "*Aërobryum lanosum* Mitten in Journ. of the Proceed. of the Linn. Soc., 1859, Suppl. p. 90 (*Meteorium*). (*M. longissimum*, Doz. et Molk., Musci Archip. Ind. t. 48? et Bryol. Javan. t. 202, var. tenue.)" This alone renders it perfectly clear that, if not quite convinced of the identity of his *A. lanosum* with the original of *M. longissimum*—of which he had probably not seen specimens—Mitten at any rate had no intention of separating his plant from it. His further note on *M. vitianum* confirms my view, if there were any need, for he writes: "Notwithstanding Sullivant's remark that in *Aërobryum longissimum* there are no papillæ, I find them present in authentic specimens of that moss *as well as in the Samoan specimens* [italics mine], clearly implying that he considered the Samoan specimens belonged to that species." The succeeding paragraph explains why he retained his specific name instead of adopting the earlier name *longissimum*. "The specific name '*longissimum*' was applied by Raddi to a Brazilian moss which may prove to be referable to this genus."

I think I have shown that there is no reason to suppose that

Mitten considered his *Aërobryum lanosum* a distinct species from *A. longissimum*; and this view is entirely borne out by specimens named by him. Mr. H. N. Ridley sent him a number of specimens from the Malay Peninsula, collected in 1896, for determination; of these five were named by Mitten *A. lanosum.* Two of these I have in my herbarium; they are two quite ordinary but very discrete forms of *Aërobryopsis longissima*, one (No. 447) having a somewhat dense and rigid habit, with the leaves comparatively shortly pointed—one of the characters which Fleischer assigns to *A. lanosa* (Mitt.); the other (No. 506) a long flexuose form with the leaves finely attenuated to an almost filamentous point—the reverse of what *A. lanosa*, as understood by Fleischer, ought to be! It would be quite impossible in the face of these two specimens to maintain that Mitten had in view for his *A. lanosum* something distinct from *A. longissimum.*

Fleischer's peristome characters (drawn from a Ceylonese or Celebes plant) may of course have specific value, though I should doubt it, but if so a new species must be founded on those characters, without reference to Mitten's *A. lanosum.*

New Zealand Mosses.

In Journ. Bot. 1894, p. 78, H. Boswell gave a list of some New Zealand Mosses and Hepaticæ determined by him for Mr. Cosmo Melvill. Mr. Melvill has sent me specimens of many of these, and I find that certain corrections must be made. A useful footnote drew attention to the omission from the Handbook of the N.Z. Flora of *Campylopus holomitrium* (C. M.); but the species is not, as Boswell gives it, *C. holomitrion* H. f. & W. in Lond. Journ. Bot. 1844. It was there described as *C. capillaceus.* C. Müller altered the specific name to *holomitrium* owing to the name *capillaceus* having been already employed.

The specimens named *Campylopus bicolor* Hornsch. belong to *C. appressifolius* Mitt.

Dicranum robustum H. f. & W., No. 115, is *D. Billardieri* Brid.

Macromitrium longirostre Schwaegr. is *M. gracile* Schwaegr.

M. recurvifolium Brid. is *M. longipes* C. M.

Atrichum angustatum Brid. The Australasian plant is distinct from *A. angustatum*, and should be known as *A. ligulatum* Mitt.

Hypopterygium discolor Mitt. This is quite inseparable, I think, from *H. novæ-seelandiæ* C. M., whether it be *H. discolor* or not. Mitten's plant seems to be a dubious one; he afterwards referred it to *H. Scottiæ* C. M.; Kindberg retains it as a species allied to *H. tamarisci.*

Hypnum Kneiffii Bry. eur. is *H. brachiatum* Mitt.

Hypnodendron comatum (C. M.). The specimen I received is *H. comosum* (La Bill.) Lindb.

*Helmsia** *collina* n. gen. and sp. Mr. E. S. Salmon has already pointed out that this is *Leptostomum macrocarpum* R. Br.

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* It may be noted here that Boswell's reference to Helms's "lamented death" was inaccurate; he died at Sydney, July 17th, 1914.—Ed. Journ. Bot.

HOOKERIOPSIS SUMATRANA (Bry. jav.) Broth.

This was described in *Bryologia javanica* (under *Lepidopilum*) and distinguished from *L. uticamundiana* (Mont.) Mitt. by the green—not purple—colour, autoicous inflorescence, and much narrower cells. The two species have been kept separate by subsequent authors, mainly or altogether on the ground of the inflorescence, which in the Indian plant is described by Montagne as dioicous. The colour is too variable to form a specific character, and the cell structure shows no distinction. Fleischer, *Musci . . . . von Buitenzorg*, iii, 1031, writes of *H. uticamundiana* that it is stated by Mitten to have dioicous inflorescence, but that Ceylon specimens determined by Mitten are autoicous. It seemed desirable to go into the question, and I examined original specimens in the British Museum collection. Montagne, it may be remarked, makes no reference in his original description to the inflorescence, which is referred to only in his later work (Syll. p. 13). I examined one or two fruiting stems without finding any trace of male flowers. However, M. Cardot later kindly sent me a portion of the original gathering, leg. Perrottet, and here the inflorescence is indubitably autoicous. It may be mentioned that Montagne lays stress on the "operculo conico-truncato obtusissimo" of his species, and this appeared to me to raise a further objection to the union of the two species, as the lid of *H. sumatrana* is rostellate; but Perrottet's specimens show a distinctly rostellate lid, and therefore the last vestige of reason for separating the two disappears, and *H. sumatrana* must enter the synonymy of *H. uticamundiana* (Mont.) Broth.

BARBULA RUBELLA (Hoffm.).

Paris under *Didymodon rubellus* gives as synonym: "*Barbula rubella* Mitt. in Journ. of the Linn. Soc. 1869 [xii.], p. 162."

The reference is to the Musci Austro-Americani. The only mention of the species there is under *Tortula œnea* (C. M.), under which Mitten has the note: "*T. rubellœ* simillima, sed robustior." It is hard to see how any perversity of reasoning can find in this an authority for "*Barbula rubella*"! Braithwaite (Brit. Moss Flora) gives the same erroneous reference, Paris no doubt citing from that work.

The true authority for the combination appears to be Lindb. Musc. Scand. 22 (1879), as also given by Braithwaite. The citation runs thus:

"42. *Barbula* Hedw., Lindb.
A. *Erythrophyllum* Lindb.
216. *B. rubella* (Hoffm.) Mitt."

The attribution to Mitten appears to be without justification, and the combination to be due to Lindberg himself, in this passage. It may be objected that Lindberg does not actually fulfil the demand of Art. 37 of the Vienna Rules, which for effective publication of a new combination requires, in default of diagnosis, "reference to a former description under another name," and that to make it effective he should have added "*Bryum rubellum* Hoffm., etc." But the citation of "(Hoffm.)" together with the specification of its inclusion in the Subgenus or Section *Erythrophyllum* makes it absolutely certain what species he is referring to, and it would seem somewhat gratuitous hair-splitting to reject the combination on this ground. If retained in *Barbula* the name should I think therefore stand as:

Barbula rubella (Hoffm.) Lindb. Musc. Scand. p. 22 (1879).

DICRANOLOMA DICHOTOMUM (P. Beauv.) Par.

C. Müller, Syn. i, describes *Dicranum dichotomum* (P. Beauv.) Brid. from I. Bourbon, in the section with the nerve serrate (at back); *D. Billardieri* Schwaeg., from Australia, Cape of Good Hope, etc., in that with nerve smooth. The distinction cannot hold, as the Australasian plant has the nerve normally serrate at back. He does not compare the two species otherwise, nor do the descriptions suggest any difference, beyond the fact that the inner perichætial leaves of *D. Billardieri* are described as "intima sensim longius acuminata obsolete denticulata"; but this again is erroneous, as one of the most essential characters of the Australasian species consists in the fact that the inner perichætial leaves are obtuse and muticous (rarely if ever with a short mucro), a character scarcely if at all found in any other species of the genus.

Hampe subsequently separated the Cape plant as *D. commutatum*, and subsequent authors have assumed its distinctness from *D. Billardieri* and *D. dichotomum*.

If the Australasian plant were a locally distributed species, and if the separating characters of the African plants were constant, even though slight, it would be natural to consider them as distinct species. The case, however, is far otherwise. To begin with, *D. Billardieri* is a widely spread and common species through a considerable part of the sub-antarctic region. The *Handbook of the N.Z. Flora* gives it as "abundant in all the islands, and as far south as Campbell's Island." I have from twenty-five to thirty gatherings of it in my herbarium from these regions. It is a common plant in Australia and Tasmania. It is also recorded by Mitten from Juan Fernandez, Peru and Valdivia, and by Cardot from numerous localities in Chile, Patagonia, Fuegia and the Falklands. I have studied the New Zealand and Australian plant carefully; like other widely distributed and common species, it shows a fair range of variation in habit, size, length of leaf, and certain structural characters, but it is by no means a highly variable moss, and it has a habit and especially a leaf-structure which are very characteristic and by which it is easily recognised. I think therefore it is not assuming too much to state that in my opinion all the African plants mentioned, together with one or two to be referred to later, are absolutely identical with the Australasian and South American species.

I have examined the type of Hampe's *D. commutatum*, together with his MS. notes. He gives certain points of habit, which in view of the range of *D. Billardieri* are quite valueless. He describes the cells as "brevioribus," but the upper cells are no shorter than usual in *D. Billardieri;* and he mentions certain slight differences in the form of the alar cells which I find not only to occur on New Zealand specimens but to be quite inconstant in Hampe's own type.

Further, the Bourbon plant (*D. dichotomum*) is in all respects identical with *D. Billardieri.* The leaves in the plants I have seen are mostly shorter than in the commonest forms of the Australasian moss, but quite identical forms are frequently found among the latter. The quite muticous innermost perichætial bracts in the African plants would alone afford a strong presumption in favour of their identity with *D. Billardieri.*

Dicranum tabulare Rehm. M. afr. austr., no. 32, from Table Mt., a sterile plant, is *D. Billardieri.*

Dicranoloma scopareolum (C. M.) Par., from Madagascar, was separated by C. Müller from the Bourbon *D. dichotomum* principally on the ground of the narrower hyaline border of the leaves; but it can easily be matched by New Zealand forms of *D. Billardieri*, and the width of the border is somewhat variable also in the Madagascar plant itself. Renauld suggests that it is only a "race regionale" of *D. dichotomum.*

Dicranoloma patentifolium Ren. & Card. is distinguished from *D. scopareolum* by the more serrated leaves and nerve, but these characters bring it still closer to the ordinary forms of *D. Billardieri.*

If the identity of *D. dichotomum* with *D. Billardieri* be accepted, the question of priority of the two names will have to be faced. I do not propose to enter fully upon this now, except to point out that Paris's synonomy is very incomplete. He gives for *Dicranum Billardieri* as the earliest reference "*Schwaegr. Suppl.* ii, p. 70, t. 121 (1816)"; for *D. dichotomum*, "*Cecalyphum dichotomum P. B. Prodr.* p. 51 (1805)." But *D. Billardieri* is referred to by P. Beauvais in the Prodrome, and dates from *Bridel, Musci Rec.* ii, 181 (1798). *D. Billardieri* Brid. has therefore the priority of date, but is probably to be considered ruled out under the decision of the Brussels Congress as antedating the Species Muscorum, from which work it is omitted. In that case both species would date from P. Beauv. Prodrome, in which work *Cecalyphum dichotomum* has the priority of place. *D. Billardieri*, however, is recognised and diagnosed, though on a later page, and it would seem reasonable to retain that name.

Some Australasian Species of Cryphidium.

Some notes made while comparing the Kew specimens of *C. ovalifolium* (C. M.) may be of interest.

Brotherus cites this moss as "*C. ovalifolium* (C. M. als Cryphæa)". C. Müller, however, described it as *Pilotrichum ovalifolium*, in Bot. Zeit. 1851, p. 564. He also cites *C. Mülleri* (Hamp.) Par., *C. squarrulosum* (Hamp.) Par., *C. dilatatum* (Hook. fil. & Wils.) Par.; but Paris places these all under Cyptodon, not Cryphidium, and the combinations date from Brotherus' work.

C. ovalifolium (C. M.) Broth. and *C. dilatatum* (H. f. & W.) Broth. are in many respects very similar; they may generally be distinguished by the more broadly obtuse, often rounded leaves of *C. ovalifolium*, at least on some of the branches, principally the sterile shoots (the outline of the leaf, however, varies greatly in both species, and obtuse and acute leaves may be found on the same stem); and always by the nerve, which in *C. ovalifolium* ceases at some distance below the apex, and tapers gradually away; while in *C. dilatatum* it reaches to close below the point, and ends abruptly, remaining of almost the same width throughout its upper part. The leaves are more widely spreading also, when moist, in *C. ovalifolium*.

Mitten seems to have misunderstood *C. ovalifolium*, for all the specimens at Kew collected by F. Müller, and so named by Mitten (Moreton Bay and Paramatta), have the abruptly ending thick nerve reaching to near the point. In consequence of this misunderstanding Mitten described in 1859 as a new species *Cryphæa crenulata* Mitt., a specimen from "Victoria, Tarwin, 107, F. Müller," which I have no doubt is only *C. ovalifolium;* there is nothing to separate it in the description, and, moreover, the locality indicates that it is the very same plant that Hampe described in Linnæa, 1859–60, as *Cryphæa squarrulosa*, "Hab. ad rip. Tarwin (coll. Müller)," which is certainly *C. ovalifolium*. The description agrees entirely with that; the squarrulose position of the leaves when moist conforms quite well with *C. ovalifolium*, and Müller's figure of his plant (*C. squarrulosa*, Anal. drawings Austral. M. t. xi, 1864) leaves no doubt of its identity with *C. ovalifolium*. Moreover a specimen of Reader's at Kew (Victoria; Reader, 2) determined by Mitten as *C. squarrulosa*, no doubt on the faith of Müller's drawing, is certainly *C. ovalifolium*.

I think also there is no doubt that *C. Mülleri* (Hamp.) Par. (*Dendropogon Mülleri* Hampe) is identical with the New Zealand *C. dilatatum* (H. f. & W.). *C. dilatatum* was described in 1855 in the Fl. N.Z. vol. ii, from New Zealand. Hampe described his species in 1856, and compares it with a South American species, "*D. Gorveano* proximus." Had he been acquainted with the New Zealand species he could scarcely have failed to compare it with that. His plant appears to me to be absolutely identical with *C. dilatatum*. T. W. N. Beckett appears to have come to the same conclusion, for I have a specimen collected by him in Otago, N.Z., and labelled "*Cryphæa Muelleri* Hampe—*C. dilatata* Mitt."

I should give the principal synonymy of the two plants as follows:—

CRYPHIDIUM OVALIFOLIUM (C. M.) Broth. in Engler, Pflanzenfam. Musci ii, 743 (1905).

Syn. *Pilotrichum ovalifolium* C. M. in Bot. Zeit. 1851, p. 564.
Cryphæa ovalifolia Jaeg. Adumbr. ii, 98 (1874–5).
Cryphæa squarrulosa Hampe in Linn. 1859–60, p. 636.
Cryphæa crenulata Mitt. in Journ. Linn. Soc. 1859, p. 90.

Cryphidium dilatatum (H. f. & W.) Broth. op. et loc. cit. (1905).
Syn. *Cryphæa dilatata* (H. F. & W.), Fl. N.Z. ii, 102 (1855).
Dendropogon Mülleri Hampe in Linn. 1856, p. 212.
Cryphidium Mülleri, Broth. op. et loc. cit.

SIEGLINGIA DECUMBENS IN LINCOLNSHIRE.

By E. Adrian Woodruffe-Peacock, F.L.S.

This species was first recorded for this county in 1851 by H. C. Watson. It is found in ten out of our eighteen divisions, and always under given conditions. The heath peat, however thin, must be limeless, and for certain months of the year fairly moist. As regards soils, it is found with the following frequency*: 3 on blown sand; 3-4 on river sand gravel, and on Sphagnum peat; 4–5 on heath peat, on Lincolnshire limestone, on modern river gravel, on old river gravel, and on plateau gravel; 5–6 on upper chalk: all in heath peat conditions more or less. It is recorded for the following habitats: 3–5 on moorlands when not too wet, on the open spaces of pine-oak-birch woodlands; 4–5, limestone heaths; 5–6, Roman Road-sides and parks, when on limestone; 6, chalk heaths.

I had 106 notes with exact soils and circumstances to work out the records for this county. The following notes seem worth putting into the county flora, which is only waiting for the end of the war. My brother Max told me that wild ducks are specially fond of the seeds of this grass, and in July and August frequent spots on the peaty heath for them; at this time they are moulting, and can fly with difficulty. If a duck be shot absolutely dead on the ground while feeding on *Sieglingia*, more or less of the seed may be found on its back. It is undoubtedly spread on limestone heaths by this means, and by the circular storms and whirlwinds of the same time of year. It is eaten by rabbits on moorlands of N. Lincolnshire (54) and on the Roman Road-side in S. Lincolnshire (53), but they do not now sow it, so far as I can make out.

Sieglingia is distinctly a damp-loving species, but not a lime-water lover. I have no note of it for carr peat or Hypnum peat. Though it is 3–5 on Nardus grass moors, it is not recorded for the Great Fen land proper, though it was once the home of millions of ducks. On heaths, moors, and commons where *Calluna* can just grow, more frequently where *Nardus* does on moorland, *i. e.* on places fairly dry from April to September.

The plant has not been recorded for Lincolnshire for carr peat by anyone, but exactly why I cannot make out. Perhaps our carr peats are too limy. I have two notes of it on Carex-Sphagnum peat out of this county: in neither case did I test for lime; it may have been neutral or even acid, I cannot certainly say. The most exact definition I can give of its likings is this: Its saturation band is that of the lower side of the pine-oak-birch band, but it is frequently found in physical circumstance of shallowness of peaty soil not fitted for the trees down as low as the Nardus saturation level.

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* 1 = very common, 2 = common, 3 = fairly common, 4 = rather rare, 5 = rare, 6 = very rare.

AN UNPUBLISHED LETTER TO LINNÉ.

By B. Daydon Jackson, Ph.D., Sec. Linn. Soc.

In the new volume of Linnean correspondence (noticed on p. 373) a note appears to the following effect: In the catalogue of the Linnean Society printed in 1896 there is an entry of a MS. by Frederik Allamand entitled *Genera plantarum Americanarum*, which probably accompanied a letter (3 nonis Novembris 1770) to which Linné replied on the 29th November of the same year. In spite of diligent search this manuscript has not been found.

At the time when this note was penned it was true that the manuscript was mislaid, and the then librarian declared his inability to produce it, though he remembered it. A few months later it was discovered, with other Linnean books and papers, locked in his desk, and the discovery of this disloyalty to the Society whose servant he was hastened his dismissal.

The manuscript consists of twelve leaves in octavo, the first bearing the inscription: "Friderici Allamand Genera Plantarum Americanarum nova 30 eorumque characteres naturales et species 37." On the verso we find the following letter, which, by its date, is that to which Linné replied on November 29th, 1770:—

"Carolo Linnæo
titulis majori S.

"Quæ quondam in America de plantis observavi, diu abhinc per varias terra marique peregrinationes in codice servata, dum tandem vacat tibi Botanicorum principi sistenda decrevi. Scias autem velim prioris olim itineris & longioris moræ uberiores fructus una cum Suppellectili prædonum in manus infeliciter cecidisse & quæ mihi etiamnum Supersunt, in Americam iterum peregrinato, biennii spatio collecta fuisse, pleraque in Surinam regione plantarum feracissime at vix ullo unquam diligento adita Botanice. In præsentibus, Speciminis ergo, genera hæc tibi Sisto, ex quibus judicare queas num quid utilis ex paupero cœterum penu percipiendum tibi sit, quod si sic, lubenter obtemperaturo impera? Vale!

"F. Allamand M.D:
& Legionis marinæ,
Tribuni Douglas Chirurg: major."

The new genera are enumerated as in Linné's reply (*op. cit.* 7); the original has a few words written by Linné, as against *Narthex* we find "*Panicum Crus-corvi*" and *Galarips* "*Allamanda.*" Following the genera are two pages of criticism, or rather corrections, regarding certain genera, and then the names of species; *Galarips cathartica* is now the well-known *Allamanda cathartica.*

FLORA OF SEYCHELLES AND ALDABRA.

By W. B. Hemsley, LL.D., F.R.S.

(Continued from Supplement II, p. 24.)

[The circumstances under which the publication of the second Supplement to the present volume has been interrupted are mentioned on p. 376: the two following pages are printed in order that the species described may appear during the present year. If and when the publication of the Supplement is resumed, these pages will be included in it.—Ed. Journ. Bot.]

alterna bifida, rarius apice tantum irregulariter dentata; 8 interiora minora, tenuia, lanceolata, integra, subacuta. Stamina 8, corollæ segmentis interioribus opposita; filamenta brevissima. Staminodia 8, cum staminibus alterna, antheroidea, villosissima, apiculata. Ovarium dense strigillosum, pilis simplicibus vel inæqualiter furcatis supra basin affixis, sæpius 8-loculare, loculis uniovulatis; stylus glaber, simplex, acutus, inclusus. Fructus ignotus.

Mahé: In the mountains and on the seashore, Thomasset, 162.

Northea Hook. f. in Hook. Ic. Pl. t. 1473.

The genus is limited to the two species named below, here first distinguished from each other. Horne collected imperfect specimens of both species at different dates, about forty years ago, and although he gave them different numbers he refers to them in his notes as one and the same species. He obtained no good flowers and the fruit of only one. Baker (Flora, 194), in a note under *Sideroxylon Lessertii*, suggests that Horne's n. 539 might be a species of *Sideroxylon*. Subsequently Hartog named the specimen bearing this number *Mimusops Hornei*, which he designated a trimerous *Mimusops*, though he never published a proper description of it. However, he correctly described the hexamerous structure of the flowers on the Herbarium sheet, and Hooker cites the name, though in a wrong form, as a synonym, where he founds *Northea*, instead of adopting the specific name. Flowers of *N. confusa* are still wanting, but there are obvious differential characters in the leaves and fruits. Thus:

Folia crassissima, oblonga, apice rotundata. Fructus ovoideus, 8–9 cm. diametro maximo. *N. Hornei.*

Folia tenuiora, lanceolata, acuta. Fructus subglobosus, 4–6 cm. diametro. *N. confusa.*

Northea Hornei Pierre, Not. Bot. Sapot. 1890, p. 11. *N. seychellana* Hook. f. in Hook. Ic. Pl. 1884, t. 1473. Hemsl. Cat. North Gallery ed. 4, n. 467, 486 and 501. *Mimusops Hornei* Hartog in Journ. Bot. xvii (1879), 358. *M. Horneana* Index Kewensis, iii, p. 246, et Hook. f. *loc. cit.*

Mahé: Horne, 539; Estridge; Miss North; Button; Gardiner.

Northea confusa Hemsl. sp. n.; ab *N. Hornei* foliis lanceolatis acutis et fructu minore subgloboso facile distinguitur.

Arbor excelsa, novellis ferrugineo-tomentosis; rami fructigeri incrassati. Folia breviter petiolata, tenuiter coriacea, lanceolata, 20–30 cm. longa, 8–10 cm. lata, cito glabrescentia; costa crassa, subtus elevata; venæ primariæ laterales numerosissimæ, tenues, fere rectæ. Flores vetusti sine corollis tantum visi; pedunculi crassi, rigidi, circiter 1·5 cm. longi. Calyx ferrugineo-tomentosus; tubus brevis; segmenta 6, biseriata, deltoidea, obtusa, circiter 5 mm. longa, 3 exteriora coriacea, sinubus latis; 3 interiora tenuiora. . . . Ovarium mox post anthesin valde hirsutum, loculis 6, quorum 5 jam vacuis. Fructus subglobosus, 4–6 cm. diametro; pericarpium coriaceum, tenue. Semen fructui conformum, castaneum, exalbuminosum; hilum magnum, pallidius. Embryo, amygdalinus.

Mahé: Horne, 248; Button; Baty.

Horne's specimen consists of a small branch bearing three leaves, more or less injured by insects, and a seed. Button's consists of flowers in an advanced stage, after the fall of the petals, with the ovary enlarged to one centimetre in diameter, and ripe fruits. Baty's material is a single leaf sent to Kew by the late A. F. W. Schimper. The largest seed I have seen of *N. Hornei* girthed just over 21 cm. longitudinally, and, allowing an additional 2·5 cm. for the pericarp, the fruit would be 23·5 cm. in its greater girth. Very rarely indeed two seeds are developed in a fruit, in which case the seeds present a flat surface, where they are applied to each other, and an outer, hemisphærical surface.

Plumbagineæ.

Plumbago parvifolia Hemsl., sp. n.; species foliis maximis circiter 1 cm. longis in ramorum apicibus confertis.

Fructiculus præter calyces glandulosos glaber, caulibus ramisque gracilibus rigidibusque multistriatis. Folia in ramis brevibus lateralibus terminalibusque conferta, subcarnosa, breviter petiolata, lanceolata, spathulata vel fere orbicularia, 5–10 mm. longa, apiculata. Inflorescentia perfecta non visa, sed flores breviter spicati, 1·5–2 cm. longi, ut videtur colorati. Calyx glandulis capitatis dense vestitus; lobi lanceolati, acuti, erecti, tubum æquantes. Corollæ lobi obcordati, in sinu caudiculati.

Aldabra: Fryer, 115.

It is possible that this may be a leafy condition of *P. aphylla* Bojer, but it has a different aspect and the leaves are of a different shape and texture from those casually occurring on the barren stems of *P. aphylla*.

Plumbago aphylla Bojer; Baker in Kew Bull., 1894, 148; Schinz in Abhandl. Senckenb. Naturf. Gesellsch. xxi, 88; Dupont, Report, 37.—Sæpius omnino aphylla, sed nonnunquam foliis paucis lanceolatis 5–10 mm. longis in ramis sterilibus.

Aldabra: Thomasset, 257. Astove: Fryer, 2.

Dupont gives the following distribution of this singular plant:—Astove, Cosmoledo, Assomption, Aldabra, and Gloriosa. It is also abundant in Europa Island.

MYRSINACEÆ.

RAPANEA SEYCHELLARUM Mez in Engler Pflanzenr. iv, 376. *Myrsine capitellata* Baker, Flora, 190, non Wall.

MAHÉ: Morne Blanc at 600 metres, Thomasset, 78; summit of Mount Harrison, Gardiner. SILHOUETTE: Summit of Mon Plaisir, 690 metres, Gardiner.

PASSIFLORAS IN THE HAWAIIAN ISLANDS.

BY VAUGHAN MACCAUGHEY,
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THE Passifloras* constitute a large tropical genus of about three hundred species, mostly natives of tropical and subtropical America. A few species are Malayan and Chinese. None of the species, family, or order are indigenous to the Hawaiian Archipelago, and none were known to the primitive Hawaiians. The few Indo-Malayan species do not extend east into the Polynesian flora. There are a few peculiar species in Fiji, Norfolk Island, and New Caledonia. Since the discovery of Hawaii various members of the genus *Passiflora* have been introduced into the islands, and cultivated for their ornamental flowers and foliage, or for their fruit. A number of these introduced species are now widely distributed throughout the islands, and several (*P. fœtida*, *P. edulis*, and *P. triloba*) have escaped freely from cultivation, and are now well established and naturalized. In this way the Passion-Flowers have come to be a common feature in the lowland vegetation of the various islands, both in and out of cultivation. The fruits of several species—*P. laurifolia*, *P. quadrangularis*, and *P. edulis*—are offered for sale in the Honolulu markets, under the name of Water Lemons.

The Passifloras are herbs, shrubs, or trees; mostly vines climbing by means of simple tendrils. All the Hawaiian species are vines. About a dozen species are native to the mainland United States; *P. lutea* and *P. incarnata* are common herbaceous perennials throughout the South. The leaves are alternate, simple, usually digitately lobed or angled, sometimes entire.

The most remarkable structures of these vines are the large, showy hermaphrodite flowers, the curiously shaped parts of which were likened by the early Spanish and Italian Roman Catholic travellers to the implements and accessories of the Crucifixion. The flowers are usually solitary in the axils; sometimes in axillary racemes. Each blossom is usually subtended by two or three calyx-like bracts; these are sometimes delicately pinnatifid and lace-like. The persistent calyx has five petal-like lobes. The corolla comprises five petals, inserted on the throat of the calyx; it is sometimes wanting. These ten parts were imagined, by the devout, to represent the ten apostles present at the Crucifixion, Peter and Judas being absent.

* *Astephananthes* Bory, *Monactinneirma* Bory, *Murucuia* Pers., *Disemma* Labill., *Tacsonia* Juss.

Within the corolla, upon the throat of the calyx, is a showy crown or corona, made of two or three rows of delicate, coloured filaments or fringes. These were taken to represent either the crown of thorns or the halo. The five stamens were symbols either for the five wounds or for the hammers of the executioners. The filaments are monadelphous or separate, subulate or filiform; anthers narrow and versatile. The three styles (sometimes 1–5) with capitate stigmas symbolized the three nails. The stalk supporting the stamens and ovary is the gynophore or gynandrophore, and is a characteristic of the order. The long, simple, axillary, coiling tendrils symbolized the cords or scourges. The digitate leaves suggested the hands of the persecutors. For a full statement of this interesting imagery, see Folkard's *Plant Lore, Legends, and Lyrics.*

The following excerpts from Paul Knuth's* account of *P. cærulea* will indicate the mode of pollination usual among the Passion-Flowers:

"Protandrous, humble-bee (and humming-bird) flowers; with nectar secreted by a fleshy ring in the base of the calyx, and protected by three nectar-covers (*corona—ed.*) . . . As the nectar-reservoir possesses but one ring-like aperture, visitors must go right round the reservoir to get all the nectar. Larger insects only can effect crossing; and it is easy for them to go round owing to the larger outer circlet of rays; they move from ray to ray as if on the spokes of a wheel, thrusting their proboscis as they do so.

"In the first stage of anthesis, a large insect (such as a humble-bee) when seeking the nectar, receives pollen on its back from the downwardly dehiscing anthers. In the second stage the styles have curved downwards to such an extent that the now receptive stigmas are lower than the empty anthers. It follows that older flowers are fertilized by pollen from younger ones."

Fritz Muller advances the remarkable theory (Herm. Muller, *Fertilization*, p. 268) that the corona is not for the purpose of keeping out unbidden guests, but for trapping small insects to serve as food for the hummingbirds, in return for which the latter effect pollination. Muller's observations were made in Brazil, the home of numerous Passifloras; in Hawaii, where there are no humming-birds or their equivalents, the wild vines produce an abundance of fruit. For further data on pollination see the copious account by Masters.

The fruit of the Passion-Flowers is oblong or globular; usually fleshy or berry-like (allied to the cucurbitaceous pepo). It is three-carpeled but one-loculed. The abundant seeds are borne on three to five parietal placentæ. Each seed is enveloped in a watery sack or arillus; it is this part of the fruit which is edible, and possesses distinctive flavor and aroma. The fruits of a number of species are prized in tropical regions as a flavoring for sherbets; Water Lemon Sherbet is often served in Honolulu homes. The fruit of the so-called Pumpkin Passion-flower of Brazil—*P. macro-*

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* *Handbook of Flower Pollination*, Oxford, ed. 1908, ii, 453–4.

carpa—sometimes attains a weight of seven or eight pounds. The plants are readily propagated either by seeds or by cuttings from the young wood.

For comprehensive accounts of the genus and family, see M. T. Masters, "Contributions to the Natural History of the Passifloraceæ" (Trans. Linn. Soc. London, xxvii, 593–645 (1871); and H. Harms, "Passifloraceæ," in Engler and Prantl, Naturlich. Pflanzenfam. iii, 6a, 69–94.

A species distributed here and there throughout the lowlands and lower forests of all the islands is *P. laurifolia* L. (*P. tinifolia* Juss.). This is called the Yellow Water-Lemon, sometimes the Jamaica Honeysuckle. It is the most common species in the Honolulu markets, where it and the Purple Water-Lemon are offered for sale throughout the spring and summer. The Yellow Water-Lemon is native in tropical America, but it has been long in the Hawaiian Islands, and in some parts—*e. g.* Hilo and Hamakua, on Hawaii—is very common in the wild state. The plant is glabrous; the stems terete. The leaves are oval to oval-oblong, thick, entire, and acuminate; the petiole has two glands near its summit. The leaves are bitter, and are used medicinally as an astringent. The flowers are about 2½ inches in diameter, white with red or purplish spots or blotches. In the symbolism of the Passion, these were supposed to be blood spots. The corona exceeds or equals the petals; the filaments are in three series, violet with white bands. The fruit is oval or slightly oblong, two inches in diameter and about three inches long; smooth and symmetrical. When ripe it is rich yellow spotted with white. The shell or rind is medium-hard, crisp and brittle. The pulp, composed of the arils, is whitish yellow, fragrant and edible, with many flat black seeds.

A second very common species, often appearing in the markets, is the Purple-Fruited Water-Lemon, *P. edulis* Sims. This is a native of Brazil, but is now naturalized in many tropical and subtropical countries. It was introduced into the Hawaiian Islands, many years ago, at Lili-koi, on the island of Maui, so that the native name for this species is "*Lili-koi.*" It is a vigorous woody vine, climbing to a height of twenty or thirty feet. The leaves are large, three-lobed, and serrate. The flowers are white, shaded with purple. The corona is nearly as long as the envelopes, white for the upper half and purple at the base. The fruit is oval or oblong, sometimes almost globular, and the same size as that of the Yellow Water-Lemon. The shell is thin and crisp; the juicy pulp is very fragrant, orange-colored, and with a pleasant flavour. This and the preceding species are easily raised from seeds, which germinate quickly, and grow vigorously as seedlings.

A third species with inedible fruit, often used for covering trellises, arbours, unsightly fences, etc., is *P. fœtida* L. (*P. hirsuta* and *P. hircina* Hort.), sometimes called West Indian Love-in-a-Mist. It is a high-climbing perennial vine, slender and much-branching. Its home is tropical America, but it is now thoroughly naturalized in the Hawaiian lowlands. The leaves are ovate or orbicular-ovate, 1–3½ inches long, cordate or sub-cordate at the base, the margin entire or obscurely angled, or hastately three-lobed. The surfaces are densely villous pubescent, and the more or less prominent denticulations are gland-tipped. The petioles are as long as the blades, or shorter. There is a profusion of spiral, axillary tendrils. The flowers are small, pale-greenish or white. The most conspicuous part of the flower is the epicalyx or series of three lace-like pinnatifid bracts; these are divided into slender segments, the ultimate branches filiform, terminating in glands. These are very viscid. The sepals are pale or somewhat colored; the petals are white, or sometimes flushed with pinkish. The corona is triple-rowed, as long as the petals, and colored purple and blue. The fruits are globular, ¾ inch in diameter, dry and inflated; the shining rind is bright scarlet. The fruits are not suitable for food, but are eagerly sought by the birds and mice. The former have assisted in the distribution of this species to such an extent that it has now become a pest in certain parts of the lowlands, smothering other vegetation under its vines. Medicinally the plant is used as a narcotic and an expectorant.

The Granadilla, or Grenadilla (diminutive of "Granada," a pomegranate), is *P. quadrangularis* L. It is sometimes called the Large Granadilla, in reference to the size of its fruit. It is native to tropical America, but occurs in many Honolulu gardens, as well as on the other islands. It is a tall, strong, glabrous climber; the stems are often purplish. The leaves are ovate or orbicular-ovate, cordate, mucronate, entire; the petioles have two or three pairs of glands; the stipules are large and showy. A variety *variegata* Hort. has the foliage blotched with yellow, but this form is not known in Hawaii. The flowers are large, 3–5 inches in diameter, and quite fragrant. The sepals are linear, violet, white within; the petals are also very narrow, lilac, reddish within. There are five rows of filaments in the corona; these are violet with white bars below the middle; the inner and shortest row is deep violet; the outermost row exceeds the calyx and corolla. The fruit is oblong, 5–9 inches long, with a pale yellow-green shell. The pulpy interior is succulent, sub-acid, aromatic, with many seeds. According to Wilder this vine requires the presence of bees or artificial pollination in order to ensure a crop; under ordinary conditions it does not bear as abundantly as some of the other species. The fruit is superior in quality to either the yellow-fruited or purple-fruited species.

A highly variable species is *P. alata* Dryand., which may be called the Winged Passion-Vine. *P. phœnicea* Lindl., *P. brasiliensis* Desf., *P. maliformis* Flor., *P. ovaformis* Roem., *P. latifolia* DC., *P. mauritiana* Thouars, etc., are all considered to be forms of this species. It is a native of South America, and is not common in the Hawaiian Islands. As the specific name suggests, the stem is conspicuously winged. The leaves are glabrous, oval to ovate, somewhat cordate at the base; the margin is often undulate, but otherwise entire. The petioles have two pairs of glands. The flowers are very fragrant, 3–4 inches in diameter, and purple in colour. The interior of the sepals and petals is often distinctly carmine. The corona is nearly or quite as long as the envelopes; the numerous filaments are parti-coloured with red, purple, and white bars. The fruit is ovoid and distinctly pointed, with a tough, leathery shell. When green the rind has six light stripes; when thoroughly ripe it changes to a dull orange-yellow. The pulp is juicy, aromatic, and delicious in flavor; this fruit is one of the most edible of the entire group. The vine is very handsome, and is often used for arbours and trellises; there are several fine specimens in Honolulu gardens.

The familiar May-Pop of the Southern States, *P. incarnata*, is also cultivated in Hawaii gardens. On the mainland United States it occupies the region from Virginia south to Florida and west to Missouri and Texas. It is a strong, tall-climbing vine, glabrous or nearly so, and ascending to a height of ten to thirty feet. The leaves are broadly cordate-ovate or nearly orbicular, and three-lobed to about half their depth; each lobe has two glands near the base of the blade. The surface is glabrous or somewhat pubescent; the margin is finely serrate. The petiole is ½–2 inches long, with two glands near the summit. The flowers are axillary and solitary, 1½–2 inches in diameter, white or purplish. The peduncles are longer than the petioles, and are usually three-bracted just below the flower. The sepals are linear, cuspidate on the back; both sepals and petals are tinged with purple. The corona is light purple, banded at its centre. The fruit is oblong or oval, about 2 inches long, with three sutures; when ripe it turns yellow. The name May-Pop refers to the month of ripening, in the South, and the dry, inflated character of the fruit, which is scarcely edible. In some places the vine is valued as ornamental, and is easily grown from seed.

The Blue Passion-Flower, *P. cærulea* Linn., is a native of Brazil, and the commonest species in American green-houses; it is grown out-of-doors in the Southern States and Southern California, and is not uncommon in the older gardens and estates of Hawaii. It is a strong, slender grower, glabrous and somewhat glaucous. The leaves are divided nearly to the petiole into five lanceolate or lance-elliptic entire acuminate segments; the top lower ones of these are sometimes again lobed. The flowers are 3–4 inches in diameter, and showy; slightly fragrant, and greenish-white in color. The coronal filaments are in two rows, blue at the apex, white banded at the middle, and purple at the base. The styles are light purple. The fruit is small and inedible. This species is said to hybridize freely with many other Passifloras, and numerous crosses, of minor horticultural importance, have been produced in this way.

The Scarlet Passion-Flower, *P. coccinea* Aubl. (*Disema coccinea* in Hillebrand), is a South American vine that is comparatively rare in the Hawaiian Islands. It is glabrous, with ovate, coarsely-toothed leaves; the petioles have two or three pairs of glands. The flowers are bright scarlet, with an orange corona. The fruit is edible, with juicy pulp; according to Bailey it is said to contain “a chemical property of hypnotic value”! It occurs in a few of the older gardens in Honolulu and Hilo, but is not generally known. The flowers are showy and possess horticultural merit.

The last member of this group that occurs in the Hawaiian introduced flora is the Peruvian *P. triloba* Ruiz & Pav. It has large, cordate-ovate leaves, which are three-lobed or entire. The flowers are about three inches in diameter, with showy violet reflexed sepals and petals. The corona is also conspicuous, long and cup-like; the filaments are banded white and purple. The fruit is not of horticultural importance. This species, like several other Passifloras that have been introduced in early times, has become a pest in certain districts.

In addition to the nine species that have been briefly described there may be a few other introduced species, but, if so, they are very restricted in range, and have not escaped from cultivation. A thorough census of the tropical gardens of Hawaii has never been made, and, until that is done, the very rare species will elude attention.

NEW SPECIES OF *URERA* FROM TROPICAL AFRICA.

BY DR. A. B. RENDLE, F.R.S.

THE following new species have been described in the course of elaborating the *Urticaceæ* for the *Flora of Tropical Africa*; the part of this work dealing with this family will appear shortly.

Urera Batesii, sp. nov. *Frutex* sarmentosus vel radicibus scandens, caulibus tenuibus, inermibus, glabris. *Folia* sicco membranacea, elliptica vel ovato-elliptica, breviter acuminata, apice obtusa, basi leviter cordata, margine obsolete crenata vel præcipue parte inferiore subintegra, 3-nervia cum nervis lateralibus ascendentibus utrinque 2–3 et venulis parallelis transversis subprominentibus, in facie superiore pilis paucis urentibus instructa, uterque glabra et cystolithis numerosis linearibus notata; petiolus subtenuis. *Stipulæ* caducæ. *Inflorescentiæ* petiolis paullo longiores vel breviores; *masculæ* breviter pedunculatæ, floribus in ramis ramulisque patentibus interrupte aggregatis, pedicellis brevibus; perianthio 5-partito, dorso pilis brevibus patentibus suffulto. *Infl. fœmineæ* subcorymbose paniculatæ, ramis subcompressis, floribus in ramulis cum stimulis brevibus interspersis aggregatis; perianthio leviter 4-lobo, ovario super perianthium proeminente. *Achænium* perianthio succulento baccæforme, nisi ad apicem, circumdatum.

Hab.—Cameroons; Efulen, *Bates*, 364! 364a! Fernando Po at 1300 ft. *Mann*, 305! Herb. Kew; Herb. Mus. Brit.

The stems, which are purplish when dry, attain, according to Mann, a length of 20 feet. Leaves 10–14 cm. long, 6–8 cm. wide; petiole 2·5–7·5 cm. long. Male inflorescence up to 7·5 cm. long; flower-bud about 2 mm. in diameter; pedicel about 1 mm. long. Achene enveloped except at the tip by the juicy perianth, which is about 2 mm. long.

Allied to *U. obovata* Benth., which differs in having the leaves obovate to elliptic-obovate, and the stem armed with protuberances bearing stinging hairs.

This species and *U. Elliotii* have been confused with *U. obovata* Benth. (in Hook. Niger Flora, 517), which was described from specimens collected in Sierra Leone by Vogel.

U. Talbotii, sp. nov. *Frutex* habitu *U. Batesii* sed caulibus processubus apice stimulo minuto instructis profuse armatis. *Folia* sicco membranacea, late elliptica, apice rotundato abrupte acuminata, basi emarginata, margine inconspicue crenata vel leviter undulata, nervis ut in *U. Batesii*, glabra, cystolithis in facie superiore linearibus, subtus minutis et venas comitantibus; petiolus tenuis. *Stipulæ* ovato-triangulares, acutæ, nervatæ. *Inflorescentia mascula* bene evoluta, paniculata, patens, puberula, floribus in ramulis brevibus, e ramis interrupte ortis, aggregatis; perianthio 5-partito. *Inflorescentia fœminea* quam in mare multo minor, pyramidalis, floribus in ramulis brevibus pauce-aggregatis cum processubus stimuliferis subjectis; perianthio leviter 4-lobo, margine ciliolato, quam ovario late ovoideo duplo breviore; in fructu succulento, coccineo.

Hab.—South Nigeria; Oban, *Amaury Talbot*, 618! 1502! Herb. Mus. Brit.

Stem in specimen to 6 mm. thick, profusely armed with simple or forked apparently somewhat fleshy protuberances which bear at the tip a very small stinging hair. Leaves 10–15 cm. long, 5–10 cm. wide; petiole 1·2–6 cm. long. Stipules 8 mm. long. Male panicle 2 dm. long, 2·75 dm. broad; pedicels 3–4 mm. long, open flower about 3 mm. in diam. Female inflorescence 1 dm. long; ovary about 1 mm. long. Fruit described as "a scarlet berry."

Allied to the preceding species, from which it is distinguished by the profusely armed stem, the broadly elliptical leaves, somewhat persistent stipules, and the remarkably large spreading male inflorescence.

U. Elliotti, sp. nov. *Frutex* caulibus juvenilibus crassiusculis, processubus stimuliferis sparse armatis, hispidulis, rubro-brunneis. *Folia* elliptico-ovata, apice obsolete acuminata, basi rotundata, margine subirregulariter crenato-dentata, utrinque nervis conspicuis 1–2 lateralibus super basin 3-nervatam, hispidula, cystolithis brevibus linearibus nervos et venas in facie inferiore comitantibus; petiolus crassiusculus. *Inflorescentia fœminea* patens, iterum furcata, processubus stimuliferis veluti in caule sed multo minoribus copiose armatis; floribus in ramulis ultimis glomeratis, stimulis interspersis. *Ovarium* perianthio circumdatum, stigmate subcompresso ab ore angusto protruso. *Achænium* læte brunneum, ovoideum, perianthio flavo succulento indutum.

Hab.—Sierra Leone; near Bafodeya, *Scott Elliot*, 5559! Herb. Kew.

Leaves 10–15 cm. long, 7·5–10 cm. wide; petiole up to 4·5 cm. long. Female inflorescence about 7·5 cm. long; flowers collected in small shortly stalked heads on the ultimate branches associated with little groups of stinging hairs. Achene chestnut-brown, 2 mm. long.

Near *U. obovata* Benth., but distinguished by the elliptic-ovate, not obovate, leaves with fewer lateral nerves, 1 or 2, not 3, and by the perianth in the female flower completely enveloping the ovary.

U. MANNII Benth. & Hook. f. var. PAUCINERVIS, var. nov. Planta *foliis* quam in specie minoribus, interdum obovato-ellipticis, cum nervis lateralibus utrinque 2, raro 3, super basin trinervatam. *Inflorescentia fœminea* in axillis foliorum superiorum, contermino ovato, usque ad 10 cm. longa (pedunculo vix 4 cm. longo incluso), ramis patentibus. *Ovarium* ovoideum, apice obliquo stigmatiferum, perianthium leviter lobatum excedens.

Hab.—Lagos; *Dalziel*, 1021! Herb. Kew.

U. cuneata, sp. nov. Planta *caule* crasso tereti, hispidulo, processubus tenuibus cylindricis apice breviter stimuliferis armato. *Folia* magna, breviter petiolata, cuneata, apice breviter acuminata, basi obtuse rotundata vel pæne truncata, margine denticulata et leviter undulata, nervis utrinque 3–4 lateralibus ascendentibus super basin 3-nervatam, nervis et venis transversis horizontalibus subtus conspicuis, in facie superiore modo in nervis puberula, subtus sparse pubescentia, cystolithis haud apparentibus; petiolus crassus velut in caule armatus. *Inflorescentia fœminea* (juvenilis) puberula, rhachi robusto stimulis interdum in processubus irregulariter ramosis elevatis obsito, ramis paucis patentibus; floribus in cymulis unilateralibuse ramulis ultimis brevibus ortis. *Perianthium* pæne ad basin 4-partitum, segmentis obovato-oblongis margine superiore ciliolatis, ad medium ovarii ovoidei attingens. *Stigma* apicale brunneum, penicillatum.

Hab.—Liberia; Sinoe basin, *Whyte!* Herb. Kew.

Leaves 15–17·5 cm. long, 9–10·5 cm. wide; petiole 1·2 cm. long. Young female inflorescence about 5 cm. long. Ovary barely 1 mm. long.

A very distinct species, at once recognised by the large wedge-shaped leaves.

U. usambarensis, sp. nov. *Frutex* forsan scandens, caulibus glabris, inermibus, cortice cinereo striato. *Folia* coriacea, elliptica vel obovata, apice acuminata, basi obtusa, rotundata vel obsolete cordata, margine integra, utrinque sæpe nervo singulo inconspicuo laterali ascendente super basin conspicue 3-nervatam, glabra, in facie inferiore sparse cystolithis brevibus linearibus notata; petiolus tenuis. *Stipulæ* ovatæ, acutæ. *Inflorescentiæ masculæ* in parte caulis superiore et ramis juvenilibus brevibus axillariæ, glabræ, ramis lateralibus patentibus; floribus in ramis vel ramulis brevibus quasi glomeratis. *Perianthium* 4-partitum, segmentis ovatis, concavis, glabris.

Hab.—Usambara; Derema, *Volkens*, 122! *Scheffler*, 196! Herb. Kew; Herb. Mus. Brit.

Branches of the second season up to 4 mm. thick. Leaves 4·5–6 cm. long, 2·5–3·5 cm. wide; one or both members of the pair of rather weak upper nerves may be absent; petiole 1·2–2 cm. long. Stipules barely 4 mm. long. Male inflorescence 5–7·5 cm. long; flowers in short sessile clusters on the branches of the first or higher order; pedicels about 1 mm. long; bud barely 2 mm. in diameter.

A distinct species, characterised by the rather small entire conspicuously 3-nerved leaves, and the feeble and varying development of an upper pair of lateral nerves.

SHORT NOTE.

ISLE OF WIGHT PLANTS.—*Malva borealis*, Wallm. This plant, which my friend Mr. J. W. Long found growing in an arable field just outside Newport, has not been hitherto recorded for the Isle of Wight, and in only two localities in Hampshire (under the name of *M. pusilla*, Sm., in Townsend's *Flora of Hampshire*). It is in great abundance, and with ripe fruit, in the field, in which there was this year a crop of oats. The field adjoins a flour mill. A plant of *Dipsacus fullonum*, L., was observed in the same field. —*Juncus bufonius*, var. *fasciculatus*, Bertol. St. Boniface Down, near Ventnor, June 22nd, 1872. The specimens are all under 2 inches in height, and have the fruits two or three in fascicles. A diminutive form of *J. bufonius*, but not with fruits in fascicles, is abundant on the Downs at Freshwater. Another form of *J. bufonius* which agrees well with specimens distributed by Billot, under the name of *J. zanarius*, Perr. et Song., having fruits in fascicles, but taller than my specimens of *fasciculatus*, I found at King's Quay, near Osborne. These also agree with Dr. Boswell Syme's specimens of var. *fasciculatus* sent by him from the shores of Loch Leven, Kinross.—*Valerianella eriocarpa*, Desf. Through the kindness of its owner, Mr. Jeffery, I have had the opportunity of examining the interleaved copy of Bromfield's *Flora Vectensis*, which belonged to the late Mr. A. G. More. Under *Fedia dentata*, Vahl (p. 244) he made the following note: "In the allotments Shanklin a var. with the cup of the calyx larger than usual, unequally four-toothed, and a very few short hairs, principally on the calyx, *i. e.* three teeth in front, and a large one, itself tridentate, behind. The hairs are very few and short, and other specimens growing at same place do not show them at all, though otherwise quite similar and with equally large calyx. No veins on the calyx of either." This description, and a drawing of the fruit which Mr. More appended, leave little doubt that the plants were *V. eriocarpa*, Desf. The only specimens of *V. mixta*, Dufr. which I have are those in Billot's exsiccata, from Strasbourg (not very good ones); if they are to be accepted as authentic, they partake much more of the character of *V. dentata*, Koch.

FREDERIC STRATTON.

REVIEWS.

Bref och skrifvelser af och till Carl von Linné ; Andra Afdelningen —Utländska brefväxlingen, Del 1, Adanson—Brünnich. Utgifven och med upplysande noter försedd af J. M. Hulth. Upsala [1916). Pp. viii + 430.

This is the seventh volume of the correspondence and short pamphlets of the great Swedish naturalist issued by the University of Upsala. Six volumes of the first series, containing the letters which pased between Linné and his own countrymen, as far as Hallman, have previously been published under the editorship of the late Prof. T. M. Fries, whose extraordinary knowledge of Linnean material, and of the persons contemporary with Linné, was acknowledged to be unequalled. This sixth volume was noticed in the *Journal of Botany*, l (1912), 262–263.

Since that date the gifted editor has passed away, and his successor has begun his labours by issuing the first volume of the second series, which is devoted to the foreign correspondence of the famous Upsala professor. Dr. Hulth is known to all students of Linnean literature, by his admirable bibliography of the master's writings, and he has succeeded in successfully continuing his predecessor's labours, in spite of the heavy work devolving upon him as one of the chief librarians of the University Library at Upsala.

This volume will probably appeal to many people whose interest in the preceding volumes was not vivid, inasmuch as we have here letters from many different nationalities, and frequently replies to them. Forty-nine correspondents figure here, and some of them must be mentioned.

Beginning with Adanson, the third letter-writer is Frederik Allamand, born in Switzerland about 1735, and probably the son of the Leyden professor J. N. S. Allamand. The letters which appear here are the result of the younger Allamand's visit to Dutch Guiana. The introductory note refers to an entry in the printed Library Catalogue of the Linnean Society of "*Genera plantarum Americanarum*," which, when Dr. Hulth was last here, in the spring of 1914, could not be found. (The MS. was afterwards found, and an account of it is given on p. 362.) Frequent letters passed between Linné and Allioni, J. Amman, Arduino, and Ascanius. Then we have the letters of Frederick Calvert, sixth and last Baron Baltimore (1731–1771) who published an account of his travels in Sweden in Latin verse, and presented a copy in special binding to Linné, with a gold snuffbox. Two letters from Sir Joseph Banks (one in the handwriting of Solander) follow, then four from John Bartram,—a long series from Bartsch, Beckmann, the author of "A History of Inventions," and our own countryman Patrick Browne,—eleven letters with one in English from Linné.

Naturally this brief list does not exhaust the names of writers whose letters will repay perusal. We trust that Dr. Hulth will be able to issue these volumes in speedy succession, although his leisure is far less than that of the late emeritus professor, who could devote practically the whole of his time to the prosecution of his work.

B. D. J.

British Forestry: its Present Position and Outlook after the War. By E. P. Stebbing, Head of the Forestry Department, University of Edinburgh. John Murray. Pp. xxv, 257, with 13 plates. Price 6*s.* net.

With no pretension to be a text-book or manual of British forestry for normal times, this forceful volume is frankly polemical. Mr. Stebbing is very naturally impressed by the enormous consumption of timber now in progress and the great demand imminent when the war is over. As he says, "A very considerable destruction of forest is taking place and has taken place within the fighting area. To this must be added enormous amounts of timber felled and used up in the preparation of trenches and fortified lines, which now run into many hundreds of miles; in the provision of sleepers for the network of light railways behind the firing line and elsewhere, and so on. Young pole growth (*i.e.* young sapling woods) has been sacrificed wholesale to form corduroy roadways and for other purposes."

To replace the present drain on our resources and provide for the future, Mr. Stebbing urges first that six and a half million acres in the British Isles should be planted up at once with Tyrolese Larch, Scots Pine, Common Spruce, and Austrian Pine, with, perhaps, Douglas, Sitka Spruce, and Japanese Larch; and secondly that, to provide for our needs while these are growing, our Government should arrange a lease—apparently for ninety years—of the forests of Finland.

Two-fifths of the book are devoted to the forest resources of Russia, one-fifth to an exposition of the amount of our imports of foreign timber, and nearly as much space to showing the extent to which women may be employed in forestry. Most of the matter is reprinted from various recent magazine articles, which involves some repetition, and some of the author's premises have been disputed, *e.g.* the area suitable and available for immediate planting. We may doubt whether Corsican Pine (*Pinus nigra* Arnold, var. *Poiretiana*) is not preferable to Austrian (var. *austriaca*); and we believe that, before the war, Bavarian foresters were already inclined to abandon *Larix leptolepis* Gord. in favour of *L. kurilensis* Mayr or even of our own European species, of which the "Tyrolese Larch," of which Mr. Stebbing writes, is merely a local race. Such minor details apart, however, the author has a strong case, to which he does full justice. He has brought together a most interesting mass of evidence, upon which his great technical experience fully entitles him to form a judgment.

G. S. B.

BOOK NOTES, NEWS, &c.

Dr. C. H. Ostenfeld during his visit to West Australia in 1914 made a careful study of the biology, ecology, and taxonomic relations of the so-called "sea-grasses"—species of *Cymodocea*, *Diplanthera*, and *Posidonia* in the family Potamogetonaceæ, and *Halophila*, a member of the Hydrocharidaceæ. His paper, which has been recently published (*Dansk Botanisk Arkiv*, *Bot.* ii, No. 6, Sept., 1916), is in English and forms the first part of a series of contributions to West Australian Botany. Dr. Ostenfeld recognises three species of *Cymodocea*, including a new one, *C. angustata*. He does not follow Mr. Black in the subdivision of the widely-spread *C. antarctica* into two species, but regards these as merely representing ranges of variation. The other species are *Diplanthera australis*, found sparingly in one locality, the common *Posidonia australis*, and the widely-spread *Halophila ovalis*.

At the meeting of the Linnean Society, on November 2nd, a paper was read by Mr. G. S. Boulger, entitled "Early Chapters in Plant Distribution," of which he sketched the first glimpses in the works of Cardinal Bembo, M. de l'Obel, Sir Hans Sloane, Dr. Christian Mentzel, and J. Pitton de Tournefort: the last has enjoyed a reputation which his actual record as to plant distribution does not deserve, believed to be the result of an early misquotation from his 'Voyage du Levant.' The second chapter was devoted to Linnæus, whose *Flora Lapponica* and several theses in the *Amœnitates Academicæ* were brought forward in support. Next followed Haller, J. G. Gmelin, Buffon, Forskål, and C. L. Willdenow, with a brief allusion to P. A. Broussonet.

Mr. Fisher Unwin has published *A Hausa Botanical Vocabulary* (8vo. cloth, pp. 119, price 6*s*. 6*d*. net) by Dr. John M. Dalziel, of the West African Medical Staff. We learn from the wrapper—for the book contains no sort of introduction!—that its aim is to record the Hausa names of the common plants of Northern Nigeria, with their scientific equivalents and a "brief definition of the plant": in many cases an indication of its uses and products is added. Within the limits thus defined, the book, which is admirably printed, seems to be very well done; the native names, however, are not translated, nor is there any indication of the folk-lore which must assuredly be connected with many of the plants.

In the sixth volume of the *Memoirs of the New York Botanic Garden*, which contains the papers presented on the occasion of the celebration (September, 1915) of the twentieth anniversary of the establishment of the Garden, is an account of "A Botanical Trip to W. North Wales in June"—presumably of that year, though this is not stated—by Mr. Arthur H. Graves, of the Connecticut College for Women. One of the things which impressed him most was "the comparatively large number of indigenous plants which are also native in North America . . . The generally accepted belief in a closer relation or a connection between Europe and America in former geologic times was thus brought home to me more forcibly than ever before; for what could be more convincing evidence than to find such plants as the Marsh Marigold, the low Juniper, and the Sweet Gale, thrifty and important members of the native flora?"

BRITISH botanists will learn with pleasure that JOHN GOODYER (1592-1664), one of our earliest critical botanists, is to be duly honoured in Hampshire, his native county. A window to his memory is being placed in the church at Buriton, where he is buried: this bears the Goodyer arms—gules, a fesse between two chevrons vair—and the canting crest—a partridge holding a *good ear* of wheat in its beak. This pun accounts for the twenty odd variants of the name, the spelling of which depends upon county and century. The inscription is: "To the glory of God and in memory of John Goodyer of Alton, Mapledurham, Petersfield, 1592-1664: Royalist, Botanist, and Founder of the Goodyer Charity, Weston. Buried in Buriton Churchyard." Weston is a portion of Petersfield and Buriton. Goodyer's house is still standing—the oldest house in the Spain, Petersfield—and on this is to be placed a commemorative tablet. His "charity" brings in over £80 annually. An autograph copy of Lord Hopton's orders (1643) that Goodyer should not be molested has recently been acquired, and will hang next the window. All this will cost about £30, towards which sum Magdalen College, to which Goodyer bequeathed his library, is contributing £5. Donations (which may be sent to the Editor of this Journal) will be gladly received towards completion of the amount. It will be remembered that Goodyer's description of Elms in Johnson's edition of Gerard's *Herball* is accepted as the most accurate account of the British species. An interesting paper on Goodyer by Canon John Vaughan was published in the June number of the *Cornhill Magazine* for 1909.

WE regret to announce the death of Dr. H. H. W. PEARSON (1870–1916), Director of the National Botanic Garden of South Africa, which occurred at Wynberg on November 3rd. LORD REDESDALE (Algernon Bertram Freeman-Mitford) (1837–1916) was better known as a horticulturist than as a botanist; he had, however, an extensive knowledge of Bamboos, upon which he published a book (*The Bamboo Garden*) in 1868. His *Memories*, published in 1915, contained an interesting account of his relations with Kew under the late Director, to which we made some reference on p. 38. We still hope to obtain from Sir George Birdwood a notice of his friend Sir CLEMENTS R. MARKHAM (1830–1916), whose death was briefly announced on p. 96.

WE have received the *Thirty-second Annual Report of the Watson Botanical Exchange Club for* 1915–1916: it as usual contains much interesting matter, some of which we hope to reprint in an early issue.

TO OUR SUBSCRIBERS.

We have no intention of troubling our readers with a narration of the many and various difficulties which have attended the production of the Journal throughout this year and which show no signs of abating. Many of these affect the Editor alone, who, it is not too much to say, has had more trouble during the last eleven months than he had had in the preceding thirty-six years during which he has conducted the Journal.

We are assured by the printers and publishers that these are due to the dislocation of business caused by the War: powerless as we are to remedy the inconveniences caused, we are compelled to accept this explanation as adequate, and must trust to the kindness of our subscribers to accept our assurance that the responsibility for delays, whether in publication or delivery, does not rest with us. Other arrangements for printing and publication are in progress, and subscribers are requested not to send their subscriptions until these have been completed, of which due notice will be given.

An apology seems due also for the incompleteness of the Second Supplement dealing with the Flora of the Seychelles and Aldabra. Here the Editor must take such share of responsibilty as attaches to those who begin to print a paper when only a portion of it is actually to hand. The author of the paper was so insistent on its prompt publication that we had no hesitation in beginning it, having the assurance that completion would follow. The depletion of the Kew staff by the War is, of course, largely responsible for the non-completion of the paper. We have thought it better to include the species contained in it in this year's index; if the paper should be completed, of which at present there seems no prospect, a special index of the whole will be given.

The present seems a favourable opportunity for taking our subscribers into our confidence as to the financial position. Until 1915 there was always a small balance on the right side, but last year for the first time there was a deficit. We have always said that as long as the Journal paid its way we were willing to continue it, but that we did not propose to find both work and money. The deficit for 1915 was met voluntarily by the kindness of four friends; but it is unreasonable to expect that such help can be continued. We have reason to fear that when the account for the present year is rendered there will be even a greater deficit, although it will have been noticed that the number of pages has been reduced. We should be reluctant to abandon an undertaking which has been carried on without interruption and (until the present year) with regularity since 1880, and at present we have no intention of doing so; in such an event, however, due notice will be sent to subscribers, and any subscriptions that may have been paid will be returned.

The Editor.

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CORRIGENDA.

P. 25, l. 12 from top, for "Southampton" read "Peveril Cliffs, Swanage."
P. 111, "Androsace ciliata": for correction of this paper see p. 339.
P. 274, l. 14 from top, for "*Swartziiforma*" read "*Swartzii*, forma."
P. 321, l. 17 from top, for "rhizantoicous" read "rhizautoicous."
P. 330, l. 12 from top "[inc. *Hedyotis*]" should follow *Oldenlandia* (l. 10); l. 14 from bottom for "*Somme*" read "*Sommera*."
P. 331. The footnote belongs to p. 330.
P. 332, l. 12 from bottom, after *Antirrhœa* add "[inc. *Stenostomum*]."
P. 334, l. 5 from top is a footnote to p. 333.

ADLARD AND SON AND WEST NEWMAN, LONDON AND DORKING.

SUR QUELQUES CRASSULACÉES NOUVELLES.

Par M. RAYMOND-HAMET.

Tant dans les importants matériaux qui ont été mis à ma disposition au cours de ces dernières années, que dans les riches collections que, lors d'un récent séjour à London, j'ai pu étudier à Kew Gardens et au British Museum of Natural History, j'ai découvert un assez grand nombre de Crassulacées nouvelles. Ces nouveautés ne devaient être décrites que dans la monographie dont j'ai entrepris la rédaction, voici bientôt dix ans ; mais, en retardant l'achèvement de mon ouvrage, les circonstances actuelles m'obligeaient à ne point différer plus longtemps la publication de ces espèces nouvelles. C'est pourquoi, profitant des quelques instants de liberté que me laissait mon service au Centre mécanothérapique de la 4^{e} Région, j'ai rédigé le présent mémoire que Monsieur Britten a bien voulu publier aussitôt dans le JOURNAL OF BOTANY. Que ce botaniste veuille bien trouver ici les assurances de ma très vive gratitude.

Le Mans, ce 13 octobre 1915.

Kalanchoe Dangeardi, Raymond-Hamet, sp. nova.—Caulis erectus, graciliusculus, basi ramosus deinde simplex, glaber. Folia opposita, decussata, sessilia, glabra ; lamina teres, acuta vel subacuta. Inflorescentia a caule non distincta, corymbiformis, in cymis simplicibus vel semel ramosis. Pedicelli quam corollæ tubus breviores. Calyx glaber, segmentis quam tubus longioribus, subdeltoideis, acutis, longioribus quam latioribus. Corolla subtubulosa, glabra, segmentis quam tubus brevioribus, ovatis, acutis et acuminatis, longioribus quam latioribus. Stamina supra corollæ tubi medium inserta ; antheræ superiores corollæ segmentorum basim paulo superantes. Carpella conniventia, ovata, in stylos quam carpella breviores, conniventes, graciles, attenuata. Squamæ lineares, emarginatæ, longiores quam latiores.

Le *Kalanchoe Dangeardi* est une plante glabre et vivace dont la tige assez grêle, érigée dans sa partie supérieure, a, dans cette région, un diamètre variant de 2·75 à 4 mm. Quand la plante est âgée, elle forme une touffe de tiges florifères issues d'un même caudex.

La tige porte des feuilles opposées, décussées, assez espacées.

La hauteur du premier entrenœud supérieur varie de 5 à 6·50 cm.; celle du second est de 6 cm.; celle du troisième varie de 3·2 à 6·3 cm.; celle du quatrième est de 3·5 cm.; celle du cinquième, de 2·30 cm. Sessiles, cylindriques, d'un vert teinté de rouge, hautes de 3 à 11 cm. et larges 1 à 3·50 mm., les feuilles ont leur plus grand diamètre à une faible distance de la base; à partir de ce niveau, d'une part elles se rétrécissent jusqu'à la base, d'autre part elles s'atténuent jusqu'au sommet aigu ou subaigu. Les cicatrices foliaires, qui ont la forme d'un croissant dont les pointes seraient obtuses, ne se rejoignent point par leurs extrémités latérales.

A son sommet la tige porte une inflorescence corymbiforme, haute de 5·50 à 10·50 cm. et large de 5 à 10·50 cm., composée d'un pédoncule terminal et de quatre pédoncules latéraux opposés deux par deux et terminés, de même que le pédoncule terminal, par une cyme bipare simple ou une fois ramifiée.

Assez grêles, à peine renflés au sommet, hauts de 7 à 10 mm., les pédicelles portent des fleurs dressées.

Etroitement subdeltoïdes-subsemilancéolées, légèrement élargies à la base, hautes de 1·60 mm., larges de 0·50 mm., les bractées, qui ont des bords entiers, s'atténuent peu à peu jusqu'au sommet aigu.

Le calice se compose d'un tube un peu plus bref que les segments, haut de 1 à 1·25 mm., et de quatre segments à bords entiers, plus hauts que larges, subdeltoïdes, longs de 2·75 à 3·75 mm.; ces segments, qui sont légèrement élargis à la base, se rétrécissent depuis ce niveau jusqu'au sommet aigu.

Plus longue que le calice, la corolle, d'un beau jaune d'or, a son plus grand diamètre au dessous du milieu; au dessous de ce niveau elle se rétrécit assez brusquement jusqu'à la base; au dessus, elle s'atténue assez rapidement jusqu'au milieu, puis conserve un diamètre presque identique jusqu'à la base des segments étalés. Le tube quadrangulaire, plus long que les segments, est haut de 17 à 20 mm. Ovés, plus hauts que larges, longs de 6·75 à 7 mm. et larges de 3·50 à 3·60 mm., couverts intérieurement de mamilles hyalines subhémisphériques, les segments, dont les bords sont entiers, ont leur plus grande largeur au dessous du milieu; au dessous de ce niveau, ils se rétrécissent assez brusquement jusqu'à la base; au dessus, ils s'atténuent peu à peu jusqu'au sommet aigu et assez longuement acuminé.

L'androcée se compose de huit étamines libres entre elles. Les filets alternipétales, insérés au dessus du milieu du tube de la corolle, sont très brefs; assez longuement subdeltoïdes, mamilleux, ces filets, dont la partie soudée fait légèrement saillie à l'intérieur du tube de la corolle et jusqu'à la base de celui-ci, s'élargissent peu à peu depuis le sommet jusqu'à la base qui n'est, elle même, ni élargie ni rétrécie; leur partie soudée est haute de 14·75 à 17·50 mm.; leur partie libre, longue de 0·40 à 0 50 mm., est large de 0·15 mm. à le base et de 0·12 mm. au milieu. Le sommet des filets oppositipétales, insérés un peu au dessus de l'extremité supérieure des filets alternipétales, dépasse le sommet du tube de la corolle mais n'atteint pas le milieu des segments corollins;

longuement et étroitement linéaires, ces filets s'élargissent presque insensiblement depuis le sommet jusqu'à la base qui n'est, elle même, ni élargie ni rétrécie ; leur partie soudée est haute de 16 à 18·50 mm. ; leur partie libre, longue de 1·50 à 1·70 mm., est large de 0·20 mm. à la base et de 0·12 mm. au milieu. Plus hautes que larges, oveés, émarginées à la base, longues de 1 à 1·25 mm. et larges de 0·50 à 0·60 mm.. les anthères portent, au milieu de leur sommet obtus, un petit globule sphérique.

Soudés entre eux sur une très faible partie de leur longueur totale, les carpelles sont appliqués les uns contre les autres ; longuement ovés, rétrécis dans leur partie inférieure, ils s'atténuent peu à peu, dans leur partie supérieure, en styles un peu plus brefs qu'eux, grêles, mamilleux et terminés par des stigmates légèrement dilatés ; leur partie soudée est haute de 1·40 mm. ; leur partie libre, longue de 9 à 10·50 mm., est large de 2·10 à 3 mm. ; les styles sont hauts de 6 à 7·50 mm. Dans chaque carpelle, les placentes, qui portent des ovules sur toute leur longueur, sont constitués par deux cordons grêles, verticaux, presque parallèles, quoiqu'un peu incurvés en dedans, à chacun des deux bords internes des carpelles.

Longuement linéaires, beaucoup plus longues que larges, non dilatées à la base, émarginées au sommet, les écailles sont hautes de 1·75 à 2 mm. et larges de 0·45 à 0·50 mm.

Obovées, très obtuses au sommet, arrondies à la base, plus hautes que larges, longues de 1·20 mm. et larges de 0·45 mm., les graines sont très nombreuses dans chaque follicule. Leur test, couvert de rides longitudinales peu nombreuses et assez saillantes, s'applique exactement sur l'amande.

Le *Kalanchoe Dangeardi*, qui je suis heureux de dédier à Monsieur le Professeur Dangeard, est originaire de l'Angola où, le 29 mai 1903, M. John Gossweiler, en a récolté, sur les rochers près d'Ambaim, deux fragments qui sont conservés, sous le n° 4477, dans les collections botaniques du British Museum of Natural History.

Il appartient à mon groupe 13 et se rapproche du *Kalanchoe teretifolia* Deflers * dont il se distingue : 1°, par les fleurs plus petites ; 2°, par les sépales subdeltoïdes, et non ovés ; 3°, par les pétales ovés, s'atténuant peu à peu depuis le dessous du milieu jusqu'au sommet aigu et assez longuement acuminé non point obovés, obtus et brusquement cuspidés au sommet ; 4°, par les filets staminaux et les styles mamilleux, et non lisses ; 5°, par les écailles beaucoup plus étroites.

Kalanchoe Britteni, Raymond-Hamet, sp. nova.—Caulis erectus sed in parte inferiore subrepens, graciliusculus, glaber. Folia opposita, decussata, subsessilia, glabra ; lamina obovata, in parte superiore crenata, obtusissima. Inflorescentia a caule non distincta, corymbiformis, in cyma pauciramosa. Pedicelli quam corollæ tubus breviores. Calyx glaber, segmentis quam tubus

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* A. Deflers, Note s. un *Kalanchoe* remarq. de l'Arabie tropic., in Bull. Soc. bot. France, sér. 2, t. xv, pp. 298–301, tab. iii–v (1893).—Raymond-Hamet, Monogr. du g. *Kalanchoe*, in Bull. Hb. Boissier, sér. 2, t. vii, p. 885 et 886 (1907).

multo longioribus, deltoideis, acutis vel subacutis, longioribus quam latioribus. Corolla subtubulosa, glabra, segmentis quam tubus brevioribus, obovatis, acutis et aristatis, paulo longioribus quam latioribus. Stamina supra corollæ tubi medium inserta; antheræ superiores corollæ segmentorum basim pæne attingentes. Carpella conniventia, ovato-oblonga, in stylos quam carpella multo breviores, conniventes, graciles, attenuata. Squamæ lineares, obtusæ, multo longiores quam latiores.

Le *Kalanchoe Britteni* est une plante haute de 70 cm. Glabre, assez grêle, la tige, dont le diamètre est de 6 mm. à la base et de 3·50 mm. au milieu, est érigée mais couchée dans sa partie inférieure.

Dans sa jeunesse, la tige porte des feuilles sur toute sa longueur, mais elle se dénude bientôt dans ses parties inférieure et supérieure, de telle sorte que subsistent, seules, les feuilles de sa région médiane. Opposées, décussées, les feuilles sont à peu près également espacées dans les régions inférieure et médiane de la tige mais elles sont beaucoup plus distantes les unes des autres dans la partie supérieure de cette dernière. La hauteur du premier entrenœud supérieur varie de 3 à 5·50 cm.; celle du second, de 6 à 9 cm.; celle du troisième, de 10 à 11 cm.; celle du quatrième, de 10 à 11 cm.; celle du cinquième, de 4 à 7 cm.; celle du sixième, de 4 à 6 cm.; celle du septième est de 4·50 cm.: celle du huitième, de 4 cm.; celle du neuvième, de 3·50 cm.; celle du dixième, de 2 cm.; celle du onzième, de 3·50 cm.; celle du douzième, de 3 cm. Glabres, subsessiles, hautes de 4·50 à 6 cm., larges de 1·50 à 2·80 cm. dans leur plus grande largeur et de 4·50 à 5·25 mm. à la base, obovées, très obtuses au sommet, bordées dans leur tiers supérieur de larges crénelures obtuses séparées par des sinus anguleux et peu profonds, les feuilles ont leur plus grande largeur au dessus du milieu; au dessus de ce niveau, elles se rétrécissent jusqu'au sommet très obtus; au dessous, elles s'atténuent peu à peu jusqu'à une faible distance de la base, puis elles gardent une largeur presque identique jusqu'à la base elle même où elles s'élargissent un peu, simulant ainsi un court pseudo-pétiole amplexicaule à la base. Les cicatrices foliaires, qui ont la forme d'un étroit croissant dont les pointes seraient très obtuses, se rejoignent presque par leurs extrémités latérales.

Haute de 6 à 7·50 cm., large de 6·50 à 7 cm., nettement corymbiforme, couverte de quelques rares poils glanduleux assez brièvement pédiculés, l'inflorescence, qui termine la tige, se réduit à une cyme bipare régulière deux fois ramifiée et dont les pédoncules terminaux portent un assez grand nombre de pédicelles.

Grêles, non renflés au sommet, longs de 4 à 8 mm., les pédicelles, qui sont couverts de quelques rares poils glanduleux assez brièvement pédiculés, portent des fleurs dressées.

Longuement et étroitement ovées-lancéolées, plus hautes que larges, longues de 1·40 mm., larges de 0·35 mm., couvertes de quelques rares poils glanduleux assez brièvement pédiculés, les bractées, dont les bords sont entiers, ont leur plus grand diamètre un peu au dessous du milieu; au dessus de ce niveau elles s atténuent jusqu'au sommet aigu ; au dessous, elles se rétrécissent peu à peu jusqu'à la base.

Le calice, couvert extérieurement de quelques rares poils glanduleux assez brièvement pédiculés, se compose d'un tube et de quatre segments, à bords entiers, plus hauts que larges, beaucoup plus bref que les segments, haut de 0·50 à 0·75 mm., deltoïdes, longs de 2·60 à 3·10 mm. et larges de 1·25 à 1·50 mm. ; ces segments se rétrécissent depuis la base jusqu'au sommet aigu ou subaigu.

Plus longue que le calice, glabre, la corolle a son plus grand diamètre au dessous du milieu ; au dessous de ce niveau, elle se rétrécit assez brusquement jusqu'à la base ; au dessus, elle se rétrécit assez rapidement jusqu'au milieu, puis conserve un diamètre presque identique jusqu'à la base des segments étalés. Le tube, plus long que les segments, est haut de 10·75 à 11 mm. Obovés, un peu plus hauts que larges, longs de 4·75 à 5 mm. (non compris l'acumen qui les termine), larges de 3 à 3·50 mm., couverts intérieurement de mamilles hyalines subconiques mais obtuses au sommet, les segments, dont les bords sont entiers, ont leur plus grande largeur au dessus du milieu ; au dessous de ce niveau, ils s'atténuent peu à peu jusqu'à la base ; au dessus, ils se rétrécissent assez brusquement jusqu'au sommet aigu où ils se prolongent en une ariste longue de 0·60 mm.

L'androcée se compose de huit étamines libres entre elles. Le sommet des filets alternipétales, insérés au dessus du milieu du tube de la carolle, n'atteint pas la base des segments corollins ; très étroitement linéaires-subdeltoïdes, ces filets s'élargissent presque insensiblement depuis le sommet jusqu'à la base qui n'est, elle même, ni élargie, ni rétrécie ; leur partie soudée est haute de 7·15 à 7·25 mm., leur partie libre, longue de 0·75 à 0·85 mm., est large de 0·20 mm. à la base et de 0·10 mm. au milieu. Le sommet des filets oppositipétales, insérés un peu au dessus de l'extrémité supérieure des filets alternipétales, atteint presque la base des segments corollins ; étroitement linéaires, ces filets conservent un diamètre presque identique depuis le sommet jusqu'à la base qui n'est, elle même, ni élargie ni rétrécie ; leur partie soudée est haute de 8·55 å 8·75 mm. ; leur partie libre, longue de 1 à 1·20 mm., est large de 0·15 mm. à la base et de 0·10 mm. au milieu. Plus hautes que larges, ovées, émarginées à la base, longues de 0·65 mm. et larges de 0·35 mm., les anthères portent, au milieu de leur sommet obtus, un petit globule sphérique.

Soudés entre eux sur un cinquième environ de leur longueur totale, les carpelles sont appliqués les uns contre les autres ; longuement ovés-oblongs, rétrécis dans leur partie inférieure, ils s'atténuent presque insensiblement, dans leur partie supérieure, en styles grêles beaucoup plus brefs qu'eux et terminés par des stigmates légèrement dilatés ; leur partie soudée est haute de 1 à 1·10 mm. ; leur partie libre, longue de 5·25 à 5·50 mm., est large de 1·50 à 1·60 mm. ; les styles sont hauts de 1 à 1·30 mm. Dans chaque carpelle, les placentes, qui portent des ovules sur toute leur longueur, sont constitués par deux cordons grêles, verticaux, presque parallèles, quoiqu'un peu incurvés en dedans, à chacun des deux bords internes des carpelles.

Longuement linéaires, beaucoup plus hautes que larges, non dilatées à la base, obtuses au sommet, les écailles sont longues de 2·25 à 2·40 mm. et larges de 0·20 mm.

Obovées, légèrement arquées, très obtuses au sommet, arrondies à la base, longues de 0·65 mm. et larges de 0·20 mm., les graines sont très nombreuses dans chaque follicule. Leur test, couvert de rides longitudinales peu nombreuses et légèrement saillantes, s'applique exactement sur l'amande.

Le *Kalanchoe Britteni*, qui est dédié à Monsieur James Britten, l'éminent botaniste anglais, est originaire de l'Afrique orientale où, le 14 mars 1902, Kassner en a récolté, près de Changamve, deux beaux échantillons qui sont conservés, sous le n° 258ᵃ, dans les collections botaniques du British Museum of Natural History.

Cette espèce, qui appartient à mon groupe 13, se rapproche beaucoup du *Kalanchoe longiflora* Schlechter* et du *Kalanchoe usambarensis* Engler et Raymond-Hamet †

Du premier, elle se distingue : 1°, par les feuilles garnies, dans leur tiers supérieur, de larges crénelures obtuses séparées par des sinus anguleux et peu profonds, et non de grandes dents subaigues séparées par de profonds sinus anguleux ; 2°, par l'inflorescence, les pédicelles, les bractées et les calices couverts de quelques rares poils glanduleux assez brièvement pédiculés, non point complètement glabres ; 3°, par les filets des étamines oppositipétales n'atteignant pas le sommet du tube corollin, et non le dépassant nettement ; 4°, par les styles beaucoup plus brefs que les carpelles, non point presque de même longueur que ces derniers.

Du second, elle diffère : 1°, par ses feuilles beaucoup plus étroites à la base, garnies, dans leur tiers supérieur, de larges crénelures obtuses séparées par des sinus anguleux et peu profonds, et non à bords entiers ou à peine sinueux ; 2°, par les poils glanduleux nettement pédiculés, non point subsessiles ; 3°, par les pétales aigus et aristés au sommet, et non obtus et légèrement cuspidés ; 4°, par les anthères oppositipétales atteignant presque le sommet du tube corollin, non point assez longuement distantes de ce niveau ; 5°, par les anthères pourvues, au sommet, d'un petit globule sphérique ; 6°, par les écailles plus étroites.

Kalanchoe Seilleana, Raymond-Hamet, sp. nova.—Caulis graciliusculus, basi repens et ramosus, deinde simplex et erectus, glaber. Folia opposita, decussata, petiolata, glabra ; petiolus quam lamina brevior, latus ; lamina oblonga, integra vel leviter sinuata, obtusa. Inflorescentia a caule non distincta, corymbiformis, in cyma pauciramosa. Pedicelli quam corollæ tubus breviores. Calyx glaber, segmentis quam tubus longioribus, subdeltoidei-

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* Schlechter msc., ex J. Medley Wood, Natal Pl., t. iv, tab. 320 (1903).—Raymond-Hamet, Monogr. du g. *Kalanchoe*, in Bull. Hb. Boissier, sér. 2, t. viii, p. 26 (1908).

† Engler und Raymond-Hamet, in Raymond-Hamet, Zwei n. afrik. *Kalanchoe*, in Notizbl. d. K. bot. Gart. u. Mus. zu Dahlem, Nr. 50, pp. 302–305 (Jan. 1913).

subsemilanceolatis, acutis, longioribus quam latioribus. Corolla subtubulosa, glabra, segmentis quam tubus paulo brevioribus, late ovatis, acutis, et leviter cuspidatis, paulo longioribus quam latioribus. Stamina supra corollæ tubi medium inserta ; antheræ superiores corollæ segmentorum basim paulo superantes. Carpella conniventia, longe ovata, in stylos quam carpella breviores, conniventes, graciliusculos, attenuata. Squamæ late lineares, emarginatæ, longiores quam latiores.

Le *Kalanchoe Seilleana* est une plante glabre et vivace.

Haute d'environ 30 cm., la tige, dont le diamètre est de 4 mm. à la base et de 2·25 mm. au milieu, semble être primitivement simple et érigée ; après la floraison, les parties médiane et supérieure de la tige se desséchent et disparaissent ; la partie inférieure, qui subsiste seule, s'étale sur le sol et émet de nouvelles tiges florifères.

La tige porte des feuilles opposées, décussées, pétiolées, assez espacées. La longueur du premier entrenœud supérieur est de 2 cm. ; celle du second, de 8·50 cm, ; celle du troisième, de 6 cm. ; celle du quatrième, de 1 cm. ; celle du cinquième, de 0·7 cm. ; celle du sixième, de 0·4 cm. ; celle du septième, de 0·7 cm. Plus bref que le limbe, haut de 7 mm. et large de 3 mm., le pétiole large ne s'élargit point dans sa partie inférieure et conserve la même largeur jusqu'à la base. Oblong, plus haut que large, long de 24 mm. et large de 11·50 mm., le limbe, dont les bords sont entiers ou légèrement sinués, a sa plus grande largeur vers le milieu ; au dessous de ce niveau, il s'atténue peu à peu jusqu'à la base ; au dessus, il se rétrécit peu à peu jusqu'au sommet obtus. Les cicatrices foliaires, qui ont la forme d'un croissant dont les pointes séraient obtuses, ne se rejoignent point par leurs extrémités latérales.

L'inflorescence corymbiforme et pauciflore, qui termine la tige, est une cyme bipare régulière et peu ramifiée, haute de 4·50 cm. et large de 5·50 cm.

Assez grêles, légèrement dilatés au sommet, hauts de 2·50 à 5 mm., les pédicelles portent des fleurs érigées.

Longuement deltoïdes, hautes de 1·75 mm., larges de 0·70 mm., les bractées s'élargissent peu à peu depuis le sommet aigu jusqu'à la base qui est, elle même, légèrement élargie.

Le calice se compose d'un tube plus bref que les segments, haut de 1 mm., et de quatre segments dressés ; subdeltoïdes-subsemilancéolés, plus hauts que larges, longs de 3·25 mm. et larges de 1·25 mm., les segments, qui ont des bords entiers, s'élargissent assez rapidement depuis le sommet aigu jusqu'au milieu, puis, à partir de ce niveau, s'évasent presque insensiblement jusqu'à la base qui est, elle même, légèrement élargie.

Colorée en rouge, plus longue que le calice, la corolle a son plus grand diamètre au dessous du milieu ; au dessous de ce niveau, elle s'atténue peu à peu jusqu'à la base ; au dessus, elle se rétrécit peu à peu jusqu'au milieu du tube et, à partir de ce point, conserve un diamètre à peu près identique jusqu'à la base des segments étalés. Un peu plus long que les segments, le tube est haut de 7·50 à 8·25 mm. Largement ovés, un peu plus hauts que larges, longs de 6 mm. et larges de 4·50 mm., les segments, dont les bords sont entiers, ont leur plus grande largeur au dessous du milieu ; au dessous de ce niveau, ils se rétrécissent jusqu'à la base ; au dessus, ils s'atténuent peu à peu jusqu'au sommet aigu et légèrement cuspidé.

L'androcée se compose de huit étamines libres entre elles. Le sommet des filets alternipétales, insérés au dessus du milieu du tube de la corolle, dépasse légèrement le niveau de leur insertion ; étroitement linéaires, ces filets s'élargissent à peine depuis le sommet jusqu'à la base qui n'est, elle même, ni élargie ni rétrécie ; leur partie soudée est haute de 5·60 à 6 mm. ; leur partie libre, longue de 0·70 mm., est large de 0·20 mm. à la base et de 0·15 mm. au milieu. Le sommet des filets oppositipétales, insérés un peu au dessus de l'extrémité supérieure des filets alternipétales, atteint ou dépasse légèrement le sommet du tube de la corolle ; étroitement linéaires, ces filets s'élargissent à peine depuis le sommet jusqu'à la base qui n'est, elle même, ni élargie ni rétrécie ; leur partie soudée est haute de 7 à 8 mm. ; leur partie libre, longue de 0·50 mm., est large de 0·20 mm. à la base et de 0·18 mm. au milieu. Un peu plus hautes que larges, longues de 0·75 mm. et larges de 0·50 mm., ovées, émarginées à la base, les anthères portent, au milieu de leur sommet obtus, un petit globule sphérique.

Soudés entre eux sur un peu moins d'un quart de leur longueur totale, les carpelles sont appliqués les uns contre les autres ; assez longuement ovés, rétrécis dans leur partie inférieure, ils s'atténuent peu à peu en styles plus brefs qu'eux, assez grêles et terminés par des stigmates légèrement dilatés ; leur partie soudée est haute de 1 mm. ; leur partie libre, longue de 3·50 mm., est large de 1·30 mm. ; les styles sont hauts de 1·50 mm. Dans chaque carpelle, les placentes, qui portent des ovules sur toute leur longueur, sont constitués par deux cordons grêles, verticaux, presque parallèles, quoique très légèrement incurvés en dedans, à chacun des deux bords internes des carpelles.

Assez largement linéaires, plus hautes que larges, non dilatées à la base, légèrement émarginées au sommet, les écailles sont longues de 1·75 mm. et larges de 0·40 mm.

Obovées, obtuses au sommet, arrondies à la base, longues de 0·60 mm. et larges de 0·30 mm., les graines sont très nombreuses dans chaque follicule. Leur test, couvert de rides longitudinales assez nombreuses et légèrement saillantes, s'applique exactement sur l'amande.

Cette espèce, qui est dédiée à mon ami Guy Seillé en témoignage d'affectueuse sympathie et en souvenir de nos six mois de bonne camaraderie à la clinique du Pré, a été récoltée à Prieska (Afrique australe). L'échantillon authentique, conservé dans l'herbier de l'Albany Museum de Grahamstown (Colonie du Cap), provient d'une bouture qui, en février 1910, a fleuri à Port Elizabeth dans le jardin de Mr. Armstrong.

Le *Kalanchoe Seilleana* appartient à mon groupe 13 et se rapproche beaucoup du *Kalanchoe rotundifolia* Haworth* dont il se distingue cependant : 1°, par les sépales plus étroits et plus allongés ; 2°, par le tube corollin à peine plus bref, non point deux fois plus bref que les segments ; 3°, par les pétales à peine plus longs que larges, et non environ trois fois plus longs que larges ; 4°, par les anthères oppositipétales dépassant la base des segments corollins, non point n'atteignant pas le sommet du tube de la corolle ; 5°, par les anthères pourvues, au sommet, d'un petit globule sphérique ; 6°, par les styles proportionnellement plus longs.

Kalanchoe Vatrini. Raymond-Hamet, sp. nova.—Caulis erectus, robustiusculus, simplex, glaber. Folia opposita, decussata, petiolata, glabra ; petiolus quam lamina multo brevior, latiusculus ; lamina subobovato-oblonga, in parte inferiore integra, in parte superiore crenata, obtusa. Inflorescentia a caule non distincta, paniculi-corymbiformis, in cymis ramosis. Pedicelli quam corollæ tubus breviores. Calyx glaber, segmentis quam tubus longioribus, subdeltoideis, acutis, longioribus quam latioribus. Corolla suburceolata, glabra, segmentis quam tubus multo brevioribus, late ovato-suborbicularibus, suborbicularibus vel obovato-suborbicularibus, obtusis vel subacutis sed semper mucronatis, paulo longioribus quam latioribus. Stamina supra corollæ tubi medium inserta ; antheræ superiores segmentorum medium pæne attingentes vel paulo superantes. Carpella conniventia, longiuscule ovata, in stylos quam carpella breviores, conniventes, graciles, attenuata. Squamæ longe lineares, obtusæ vel emarginatæ, multo longiores quam latiores.

Autant qu'on en peut juger par le seul fragment conservé, le *Kalanchoe Vatrini* parait avoir le même mode de végétation que les autres espèces du groupe 13. La tige glabre, érigée dans sa partie supérieure, a, dans cette région, un diamètre variant de 3·25 à 5·25 mm.

Opposées, décussées, glabres et brièvement pétiolées, les feuilles sont assez espacées. La longueur du premier entrenœud supérieur est de 12·50 cm. ; celle du second, de 17·50 cm. ; celle du troisième, de 16·70 cm. ; celle du quatrième, de 10 cm. ; celle du cinquième, de 7 cm. ; celle du sixième, de 4·80 cm. Beaucoup plus bref que le limbe, haut de 10 à 12·50 mm. et large de 4·25 à 4·50 mm. au milieu et de 6·25 mm. à la base, le pétiole est largement sublinéaire, nettement élargi à la base. Subobové-suboblong, très obtus au sommet, haut de 85 à 98 mm., large de 40 à 45 mm., le limbe a des bords entiers dans sa moitié inférieure mais ornés dans sa moitié supérieure de grandes crénelures obtuses assez irrégulières et séparées par des sinus anguleux ou plus rarement arrondis.

A son sommet la tige se termine par une inflorescence paniculi-corymbiforme, haute de 17 cm., large de 9 cm., composée d'un pédoncule terminal et de huit pédoncules latéraux opposés deux par deux. Ces pédoncules, qui sont tous terminés par des cymes bipares plus ou moins ramifiées, ne sont pas régulièrement espacés ; les paires de pédoncules latéraux supérieurs sont en effet beaucoup moins distantes les unes des autres que la paire inférieure ne l'est de celle qui lui est immédiatement supérieure.

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* Haworth, Dec. 4ª plant. nov. succulent., in The Philosoph. Magaz. and Journal., t. lxvi., p. 31 (1825).—Raymond-Hamet, Monogr. du g. *Kalanchoe*, in Bull. Hb. Boissier, sér. 2, t. vii, pp. 895 et 896 (1907).

Glabres, assez grêles, à peine renflés au sommet, les pédicelles sont longs de 4 à 7 mm.

Glabres, assez longuement deltoïdes, hautes de 1·40 à 2 mm. et larges de 0·30 à 1 mm., les bractées s'élargissent peu à peu depuis le sommet aigu jusqu'à la base où elles sont encore légèrement dilatées.

Le calice glabre se compose d'un tube plus bref que les segments haut de 0·70 à 1 mm., et de quatre segments à bords entiers, plus hauts que larges, subdeltoïdes, longs de 2·60 à 3·10 mm. et larges de 1·50 à 1·90 mm. ; ces segments s'élargissent peu à peu depuis le sommet aigu jusqu'à la base qui est, elle même, légèrement dilatée.

Glabre, plus longue que le calice, la corolle a son plus grand diamètre au dessous du milieu ; au dessous de ce niveau, elle se rétrécit assez brusquement jusqu'à la base ; au dessus, elle s'atténue assez rapidement jusqu'au tiers supérieur, puis se rétrécit presque insensiblement jusqu'à la base des segments dressés-évasés. Le tube, plus long que les segments, est haut de 10·25 à 10·50 mm. Largement ovés-suborbiculaires, suborbiculaires ou obovés-suborbiculaires, un peu plus hauts que larges, longs de 2·50 mm. (non compris le mucron qui les termine) et larges de 2·30 mm., couverts intérieurement de mamilles hyalines subhémisphériques, les segments, dont les bords sont entiers, ont leur plus grand diamètre un peu au dessous du milieu, au milieu ou un peu au dessus du milieu ; au dessous de ce niveau, ils se rétrécissent jusqu'à la base ; au dessus, ils s'atténuent jusqu'au sommet obtus ou anguleux, au milieu duquel ils portent un petit mucron long de 0·20 mm.

L'androcée se compose de huit étamines libres entre elles. Le sommet des filets alternipétales, insérés au dessus du milieu du tube de la corolle, atteint un niveau voisin de la base des segments corollins ; longuement subdeltoïdes-linéaires, ces filets s'élargissent peu à peu depuis le sommet jusqu'à la base qui n'est, elle même, ni élargie, ni rétrécie ; leur partie soudée est haute de 7·25 à 8·05 mm. ; leur partie libre, longue de 1·50 à 2 mm., est large de 0·30 mm. à la base et de 0·15 mm. au milieu. Le sommet des filets oppositipétales, insérés un peu plus haut que les filets alternipétales dépasse, légèrement la base des segments corollins ; très longuement linéaires-subdeltoïdes, ces filets s'élargissent presque insensiblement depuis le sommet jusqu'à la base qui n'est, elle même, ni élargie, ni rétrécie ; leur partie soudée est haute de 8·15 à 8·40 mm. ; leur partie libre, longue de 2·25 à 2·75 mm., est large de 0·25 mm. à la base et de 0·15 mm. au milieu. Ovées-orbiculaires, un peu plus hautes que larges, émarginées à la base et obtuses au sommet, les anthères sont longues de 0·75 mm. et larges de 0·60 mm.

Soudés entre eux sur un quart ou un cinquième de leur longueur totale, les carpelles sont appliqués les uns contre les autres ; assez longuement ovés, rétrécis dans leur partie inférieure, ils s'atténuent peu à peu, dans leur partie supérieure, en styles grêles, plus brefs qu'eux, légèrement mamilleux et terminés au sommet par des stigmates légèrement dilatés ; leur partie soudée est haute de 1·50 à 2 mm. ; leur partie libre, longue de 6 à 6·60 mm., est large de 1·90 à 2·10 mm. ; les styles sont hauts de 2·60 à 2·70 mm. Dans chaque carpelle, les placentes, qui portent des ovules sur toute leur longueur, sont constitués par deux cordons grêles verticaux, presque parallèles, quoiqu'un peu incurvés en dedans, à chacun des deux bords internes des carpelles.

Longuement linéaires, beaucoup plus hautes que larges, non dilatées à la base, obtuses ou émarginées au sommet, les écailles sont longues de 2·25 à 2·60 mm. et larges de 0·60 mm.

Obovées, très obtuses au sommet, arrondies à la base, longues de 0·65 mm. et larges de 0·27 mm., les graines sont très nombreuses dans chaque follicule. Leur test, couvert de rides longitudinales assez peu nombreuses et légèrement saillantes, s'applique exactement sur l'amande.

Cette espèce, qui est dédiée à Monsieur le Capitaine Vatrin, du 104^e^ Régiment d'Infanterie, en témoignage de respectueuse reconnaissance, est originaire de la Rhodesia où, le 20 aout 1911, le Révérend F. A. Rogers l'a récoltée, à Livingstone, localité située sur la rive septentrionale du Zambèze, à une altitude d'environ 1000 mètres, par 17° 54′ de latitude Sud et 25° 55′ de longitude Est. L'échantillon authentique est conservé, sous le n° 7444, dans l'herbier des Royal Botanic Gardens de Kew.

Le *Kalanchoe Vatrini* appartient à mon groupe 13 et se rapproche du *Kalanchoe longiflora* Schlechter * dont il se distingue : 1°, par les feuilles à limbe subobové-suboblong, crénelé dans sa moitié supérieure, au moins deux fois plus haut que large, et non obové-suborbiculaire, denté dans sa moitié inférieure, moins de deux fois plus haut que large ; 2°, par la corolle plus brève ; 3°, par les filets alternipétales plus longs ; 4°, par les anthères non pourvues au sommet d'un petit globule sphérique ; 5°, par les styles plus de deux fois plus brefs que les carpelles, non point presque aussi longs qu'eux.

Sedum Bouvieri, Raymond-Hamet. sp. nova.—Planta dioïca, perennis, steriles caules non edens. Radices crassiusculæ. Caudex erectus, crassus, simplex vel pauciramosus, caulibus vetulis et desiccatis cinctus, apice gemmulam et caules floriferos basi squamis cinctos, ferens. Squamæ deltoideæ vel deltoidei-suborbiculares, vel etiam latissime ovato-deltoidei-subsemiorbiculares, a basi usque ad apicem subacutum vel leviter mucronatum vel etiam in caudam brevem et subacutam productum, attenuatæ. Caules floriferi, erecti, graciliusculi, simplices, papillosi. Folia alterna, infra insertionem in calcar non producta, plana, papillosa, ovata, marginibus subintegris vel minute crenatis, basi in pseudo-petiolum lamina

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* Schlechter, *loco citato.*

multo breviorem contracta, apice acuta. Inflorescentia pauciflora, corymbiformis. Bracteæ foliis similes. Pedicelli papillosi, calyce breviores.—*Flores* ♂ : Calyx papillosus, segmentis 5, tubo longioribus, basi in calcar non productis, sublineari-semioblongis, vel semi-oblongi-subdeltoideis, vel deltoideis, vel etiam deltoidei-ovatis, marginibus integerrimis, apice obtusiusculis, paulo longioribus quam latioribus. Corolla subglabra, calyce longior, segmentis 5, tubo multo longioribus, nervo medio extus papilloso, subobovatis, basi leviter dilatatis, apice obtusis et mucronatis, mucrone petali apicem leviter superante, marginibus erosis, longioribus quam latioribus. Stamina 10, glabra; filamenta oppositipetala longe deltoidea, infra corollæ medium inserta; antheræ corollæ medium leviter superantes, reniformi-suborbiculares, basi et apice emarginatæ, paulo latiores quam longiores vel tam longæ quam latæ. Carpella 5, glabra, minuta, in stylos minutissimos attenuata. Squamæ 5, late obovato-subtrapezoideæ, apice leviter emarginatæ vel crenatæ, tam longæ quam latæ vel paulo longiores quam latiores —*Flores* ♀ : Calyx papillosus, segmentis 5, tubo longioribus, basi in calcar non productis, sublineari-semioblongis vel subdeltoideis, marginibus integerrimis, apice obtusiusculis, longioribus quam latioribus. Corolla subglabra, calyce paulo longior, segmentis 5, tubo multo longioribus, subobovatis vel subobovato-oblongis, basi leviter dilatatis, apice obtusis, marginibus erosis, longioribus quam latioribus, nervo medio extus papilloso. Carpella 5, pauciovulata, glabra, in stylos carpellis breviores attenuata. Squamæ 5, subquadratæ basi non dilatatæ, vel subobovato-subquadratæ infra medium leviter coartatæ et basi leviter dilatatæ, apice obtusissimæ, emarginatæ, vel emarginato-crenatæ, paulo longiores quam latiores vel tam longæ quam latæ. Folliculi pauciseminati, erecti, lateribus internis non gibbosis. Semina longe obovato-oblonga, apice obtusissima, longiora quam latiora, testa, e rugis in longitudinem dispositis prominulis instructa, nucleum apice paulo superante.

Le *Sedum Bouvieri* est une plante dioïque et vivace ayant le mode de végétation de certaines espèces de la section *Rhodiola.*

Pourvu à la base de racines épaisses, le caudex charnu, quelquefois simple mais le plus souvent divisé en un petit nombre de rameaux, porte à son sommet, ainsi qu'a celui de chacun de ces derniers, une grosse gemmule entourée par un assez grand nombre de tiges florifères disposées en ombelle. Erigé, haut de 2·50 à 6 cm., le caudex, dont le diamètre varie de 5 à 20 mm., est couvert sur toute sa longueur de vieilles tiges florifères desséchées, dépouillées de leurs fleurs et de leurs feuilles.

A la base des tiges florifères qui constituent la floraison de l'année, ainsi qu'à la base de quelques unes des tiges florifères desséchées, débris persistants des floraisons précedentes, on trouve des écailles scarieuses semblables à celles qui constituent la gemmule. Tantôt deltoïdes, un peu plus hautes que larges, atténuées depuis la base non élargie ni rétrécie jusqu'au sommet subaigu, tantôt deltoïdes-subsemiorbiculaires, plus larges que hautes ou aussi hautes que larges, atténuées depuis la base

jusqu'au sommet aigu au milieu duquel elles portent un petit mucron assez large ou se prolongent en un appendice étroitement subdeltoïde-linéaire subaigu et plus bref que l'écaille elle-même, tantôt très largement ovées-deltoïdes-subsemiorbiculaires, plus larges que hautes, ayant leur plus grand diamètre au dessous du milieu et, à partir de ce niveau, d'une part se rétrécissant jusqu'à la base, d'autre part s'atténuant jusqu'au sommet où elles se prolongent en un appendice étroitement subdeltoïde-linéaire subaigu et plus bref que l'écaille elle-même, les écailles sont hautes de 3·50 à 7 mm. et larges de 1·80 à 6·50 mm.

Les tiges florifères portent, sur toute leur longueur, des feuilles alternes, non prolongées en éperon au dessous de leur insertion, couvertes sur leurs deux faces de longues papilles hyalines très longuement et très étroitement coniques insensiblement atténuées depuis la base jusqu'au sommet subaigu. Plus haut que large, ové, long de 5·50 à 12 mm. et large de 2·25 à 5·25 mm., le limbe, dont les bords sont tantôt légèrement sinués, tantôt pourvus de petites crénelures obtuses et séparées par des sinus étroits et anguleux, ont leur plus grande largeur au dessous du milieu; au dessus de ce niveau, elles s'atténuent jusqu'au sommet aigu; au dessous, elles se rétrécissent jusqu'à la base où elles sont contractées en un pétiole linéaire beaucoup plus bref que le limbe, haut de 0·50 à 1·50 mm. et large de 0·60 à 1 mm.

Grêles, hautes de 4 à 8 cm., les tiges florifères, dont le diamètre est de 0·60 à 0·75 mm. à la base et de 0·50 à 0·60 mm. au milieu, sont entièrement couvertes de longues papilles hyalines très longuement et très étroitement coniques insensiblement atténuées depuis la base jusqu'au sommet subaigu.

Individus ♂. Corymbiforme et très pauciflore, haute de 7 à 12 mm. et large de 10 à 20 mm., l'inflorescence, qui termine la tige, est composée d'un pédicelle central et de deux pédoncules opposés. Ces pédoncules, qui portent deux ou trois pédicelles, sont couverts de longues papilles hyalines très longuement et très étroitement coniques, insensiblement atténuées depuis la base jusqu'au sommet subaigu.

Grêles, légèrement renflés, hauts de 0·70 à 1·60 mm., les pédicelles sont couverts de longues papilles hyalines très longuement et très étroitement coniques insensiblement atténuées depuis la base jusqu'au sommet subaigu.

Couvert extérieurement de longues papilles hyalines très longuement et très étroitement coniques insensiblement atténuées depuis la base jusqu'au sommet subaigu, le calice se compose d'un tube haut de 0·80 à 1·05 mm, et de cinq segments non prolongés en éperon à la base, plus longs que le tube, un peu plus hauts que larges, longs de 1·70 à 2·50 mm. et larges de 0·75 à 1·45 mm. Le plus souvent sublinéaires-semioblongs, semioblongs-subdeltoïdes ou deltoïdes, s'élargissant peu à peu depuis le sommet subobtus jusqu'à la base ni évasée ni rétrécie, ces segments, qui ont toujours des bords très entiers, sont parfois deltoïdes, ovés; dans ce dernier cas, à partir de leur plus grande largeur qui se trouve alors au dessous du milieu, d'une part ils se rétrécissent jusqu'à la base, d'autre part ils s'atténuent jusqu'au sommet subobtus.

Plus longue que le calice, la corolle se compose d'un tube haut de 0·70 à 1 mm. et de cinq segments, obovés, beaucoup plus longs que le tube, plus hauts que larges, hauts de 2·80 à 3·20 mm. et larges de 1·25 à 1·85 mm. Ces segments, dont les bords sont entiers dans leur tiers inférieur mais nettement rongés dans leur tiers supérieur et leur tiers médian, ont leur plus grande largeur au dessus du milieu ; au dessous de ce niveau, ils s'atténuent peu à peu jusqu'à une faible distance de la base où ils s'évasent légèrement jusqu'à la base elle même ; au dessus, ils se rétrécissent jusqu'au sommet obtus, au milieu duquel s'érige un large mucron obtus qui n'est que le prolongement de la carène, qui de la base au sommet suit extérieurement leur nervure médiane et qui est couverte de longues papilles hyalines très longuement et très étroitement coniques, insensiblement atténuées depuis la base jusqu'au sommet subaigu.

L'androcée se compose de dix étamines glabres, à filets longuement deltoïdes; les filets oppositipétales, dont le sommet dépasse un peu le milieu de la corolle, sont insérés au dessous de ce niveau; leur partie soudée est haute de 0·70 à 1·25 mm.; leur partie libre, longue de 1·25 à 1·40 mm., est large de 0·40 à 0·50 mm. à la base et de 0·25 à 0·35 mm. au milieu. Les filets alternipétales sont soudés à la corolle sur une longueur égale à celle du tube de cette dernière, c'est à dire, sur une longueur variant de 0·70 à 1 mm.; leur partie libre, haute de 1·50 à 1·70 mm., est large de 0·35 à 0·60 mm. à la base et de 0·10 à 0·25 mm. au milieu. Réniformes-suborbiculaires, un peu plus larges que hautes ou aussi hautes que larges, les anthères sont émarginées à la base et au sommet ; leur hauteur varie de 0·40 à 0·50 mm., leur largeur, de 0·45 à 0·50 mm.

Le gynécée, presque totalement avorté, se compose de cinq carpelles glabres extrêmement réduits, hauts de 0·80 à 1·40 mm. et terminés par des styles plus brefs qu'eux, d'une longueur variant de 0·10 à 0·15 mm.

Aussi hautes que larges ou un peu plus hautes que larges, largement obvées-subtrapéziformes, longues de 0·60 à 1 mm. et larges de 0·60 à 0·80 mm., les cinq écailles s'atténuent peu à peu depuis le sommet jusqu'a la base qui est, elle même, tantôt élargie, tantôt non élargie ; leur sommet est tantôt légèrement émarginé et pourvu alors de deux lobes larges obtus et entiers séparés par un large sinus arrondi et entier, tantôt pourvu d'une large et peu profonde échancrure garnie sur toute sa largeur de crénelures peu nombreuses et peu profondes séparées par de larges sinus arrondis.

Individus ♀. Corymbiforme et très pauciflore, haute de 5 à 10 mm. et large de 8 à 10 mm., l'inflorescence, qui termine la tige, est composée d'un pédicelle central et de trois pédoncules ternés. Ces pédoncules, qui portent deux ou trois pédicelles, sont couverts de longues papilles hyalines très longuement et très étroitement coniques, insensiblement atténuées depuis la base jusqu'au sommet subaigu.

Grêles, nettement renflés au sommet, hauts de 1 à 1·40 mm., les pédicelles sont couverts de longues papilles hyalines très longuement et très étroitement coniques insensiblement atténuées depuis la base jusqu'au sommet subaigu.

Couvert extérieurement de longues papilles hyalines très longuement et très étroitement coniques insensiblement atténuées depuis la base jusqu'au sommet subaigu, le calice se compose d'un tube haut de 0·25 à 0·60 mm., et de cinq segments, non prolongés en éperon à la base, beaucoup plus longs que le tube, plus hauts que larges, longs de 1·75 à 2·40 mm. et larges de 0·70 à 1·25 mm. ; sublinéaires, sublinéaires-semioblongs ou subdeltoïdes, ces segments, qui ont des bords entiers, s'élargissent peu à peu depuis le sommet jusqu'à la base qui, le plus souvent, n'est ni élargie, ni rétrécie, mais qui, quelquefois cependant, est légèrement élargie.

Un peu plus longue que le calice, la corolle se compose d'un tube haut de 0·10 à 0·20 mm., et de cinq segments, beaucoup plus hauts que le tube, plus longs que larges. Longs de 2·75 à 2·80 mm. et larges de 1 à 1·80 mm., ces segments, dont les bords sont entiers dans leur tiers inférieur mais profondément et irrégulièrement subcrénelés dans leur tiers médian et leur tiers supérieur, sont plus ou moins largement obovés-oblongs et ont leur plus grande largeur au dessus du milieu ; au dessous de ce niveau ils s'atténuent peu à peu jusqu'à une faible distance de la base où ils s'évasent légèrement jusqu'à la base elle même ; au dessus, ils se rétrécissent jusqu'au sommet très obtus ; ils sont glabres mais la carène qui, de la base au sommet, suit extérieurement leur nervure médiane, est couverte de longues papilles hyalines très longuement et très étroitement coniques, insensiblement atténuées depuis la base jusqu'au sommet aigu.

L'androcée fait complètement défaut.

Glabres, soudés entre eux sur un cinquième environ de leur longueur totale, les carpelles sont atténués, dans leur partie supérieure, en styles assez grêles, plus brefs qu'eux et terminés au sommet par des stigmates à peine dilatés ; leur partie soudée est haute de 0·75 mm. ; leur partie libre, de 2·50 à 3 mm. ; les styles sont longs de 0·50 à 0·75 mm.

Un peu plus hautes que larges ou aussi hautes que larges, longues de 0·60 à 1·25 mm. et larges de 0·55 à 0·60 mm., les écailles sont tantôt subquadrangulaires, tantôt longuement subobovées-subquadrangulaires ; dans le premier cas, elles ont une largeur identique depuis la base qui n'est, elle même, ni élargie ni rétrécie, jusqu'au sommet où elles sont pourvues de deux groupes latéraux de deux crénelures, séparés par un large sinus arrondi ; dans le second cas, leur plus grand diamètre se trouve au dessus du milieu : au dessous de ce niveau, elles s'atténuent peu à peu jusqu'à une faible distance de la base où elles s'évasent légèrement jusqu'à la base elle-même ; au dessus, elles se rétrécissent jusqu'au sommet obtus et largement mais peu profondément émarginé.

Les follicules, au nombre de cinq, sont appliqués les uns contre les autres et ont des faces internes non gibbeuses. Dans chaque follicule, les placentes, qui portent des ovules sur toute leur longueur, sont constitués par deux grêles cordons qui courent tout le long des faces internes des carpelles et parallèlement à celles-ci.

Plus hautes que larges, longuement obovées-oblongues, longues de 1·25 mm. (y compris l'aile supérieure) et larges de 0·35 mm., les graines, dont le test est presque lisse, sont prolongées au sommet par une aile subdeltoïde-subsemioblongue très obtuse longue de 0·15 mm.

Cette espèce, que je suis heureux de dédier à Monsieur le Professeur Bouvier, Membre de l'Institut de France, en témoignage de ma respectueuse et sincère gratitude, est originaire du Nepal où, le 23 juillet 1886, J. F. Duthie en a récolté, sur les rochers situés aux environs de Chalell, dans la vallée de Káli, de beaux échantillons qui croissaient à une altitude d'eviron 4000 mètres. Le 27 juillet 1886, ce même collecteur en a recueilli, sur les rochers de Nampa, quelques échantillons qui croissaient à une altitude d'un peu plus de 4000 mètres. Comme les précédents, ces spécimens sont conservés, sous le n° 5565, dans l'herbier du Jardin botanique de Dehra Dun (Indes Anglaises).

Le *Sedum Bouvieri*, qui appartient à la section *Rhodiola*, se rapproche des espèces de ce groupe dont les tiges fiorifères desséchées persistent sur toute la longueur du caudex érigé, et plus particulièrement du *Sedum gelidum* Karelin et Kiriloff[*] et du *S. Stracheyi* Hooker f. et Thomson[†] mais sa papillosité caractéristique permet de le distinguer fort aisément de ces deux espèces.

Sedum Cretini Raymond-Hamet, sp. nova.—Planta dioica, perennis, steriles caules edens. Caudex repens, gracilis, simplex vel basi ramosus, steriles et floriferos caules basi squamis cinctos, edens. Squamæ deltoidei-semiorbiculares vel semiorbiculares, a basi usque ad apicem obtusum attenuatæ. Caules floriferi erecti, graciles, simplices, mamillosi. Folia alterna, infra insertionem in pseudo-calcar obtusum producta, plana, anguste oblonga vel subobovato-oblonga, marginibus integris vel paucicrenatis. Inflorescentia pauciflora, umbelliformis. Pedicelli glabri.—*Flores* ♂ : Calyx glaber, segmentis 5, tubo multo longioribus, basi in calcar non productis, anguste sublineari-semioblongis, marginibus integris, apice obtusis, longioribus quam latioribus. Corolla glabra, calyce paulo longior, segmentis 5, tubo multo longioribus, obovato-oblongis, apice obtusis, marginibus integris, longioribus quam latioribus. Stamina 10, glabra; filamenta oppositipetala sublinearia, infra corollæ medium inserta; antheræ petalorum apicem superantes, ovato-reniformes, basi emarginatæ, apice obtusæ, tam longæ quam latæ. Carpella 5, glabra, in stylos graciliusculos, quam carpella breviores, attenuata. Squamæ 5, obovato-subtrapezoideæ, apice emarginatæ, tam longæ quam latæ.

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[*] Karelin et Kiriloff, in *Bull. Soc. nat. Moscou*, t. xv, p. 355 (1842).

[†] J. D. Hooker & T. Thomson, "Præcurs. ad Fl. Ind.," in *Journ. of the Proceed. of the Linn. Soc., Bot.*, t. i, pp. 96 et 97 (1857).

Le *Sedum Cretini* est une plante vivace, glabre et dioïque.

Primitivement grêle, simple et rampant, le caudex se termine à l'une de ses extrémités par les racines, à l'autre par un petit renflement qui donne naissance aux tiges florifères. Sur la portion rampante du caudex on voit se développer bientôt de petites gemmules à la base desquelles apparaissent quelques brèves racines. Ces gemmules, d'abord contigues au caudex qui leur a donné naissance, s'écartent bientôt de ce dernier, portés à l'extrémité de grêles stolons qui apparaissent entre leur base et le caudex et qui s'allongent peu à peu, les entraînant avec eux. Comme le caudex, ces stolons sont renflés au sommet où ils émettent, soit des tiges stériles, soit des tiges florifères. Ainsi, quand la plante est âgée, elle se compose d'un caudex menu et rampant, émettant sur toute sa longueur de longs stolons grêles qui, comme ce dernier, portent à leur sommet, une ou plusieurs tiges florifères ou stériles développées à l'aisselle de quelqu'une des écailles des gemmules.

Un peu plus hautes que larges, deltoïdes-semiorbiculaires ou semiorbiculaires, longues de 1·25 à 1·60 mm. et larges de 2·20 à 3·20 mm., les écailles des gemmules s'atténuent peu à peu depuis la base jusqu'au sommet obtus.

Hautes de 3 à 5 cm., érigées, plus ou moins mamilleuses, les tiges florifères portent, sur toute leur longueur, des feuilles alternes, planes, prolongées au dessous de leur insertion en un très court pseudo-éperon obtus et haut de 0·50 à 0·60 mm. Hautes de 8 à 14 mm. et larges de 2 à 2·80 mm., étroitement oblongues ou subobovées-oblongues, ces feuilles ont leur plus grand diamètre au dessus du milieu ; au dessus de ce niveau, elles se rétrécissent peu à peu jusqu'au sommet obtus ; au dessous, elles s'atténuent jusqu'à la base. Les feuilles inférieures ont des bords entiers, mais les feuilles supérieures sont pourvues, dans leur tiers supérieur, de deux ou trois crénelures obtuses.

Haute de 11 mm. et large de 17 mm., l'ombelle, qui termine la tige, se compose de six à huit pédicelles insérés au même niveau et de longueur à peu près égale.

Grêles, mamilleux, à peine renflés au sommet, les pédicelles portent des fleurs érigées.

Fleurs ♂. Le calice se compose d'un tube très bref et de cinq segments non prolongés en éperon à la base, plus longs que le tube, plus hauts que larges, longs de 3·60 à 5·20 mm., et larges de 0·80 à 1·50 mm. Etroitement sublinéaires-semioblongs, ces segments, dont les bords sont entiers, s'élargissent peu à peu, d'abord assez rapidement puis presque insensiblement, depuis le sommet obtus jusqu'à la base qui, elle même, n'est pas élargie ou l'est très légèrement.

Un peu plus longue que le calice, la corolle se compose d'un tube très bref et de cinq segments beaucoup plus longs que le tube, plus hauts que larges, longs de 5·20 à 6 mm. et larges de 1·50 à 1·90 mm. Obovés-oblongs, ces segments, dont les bords sont entiers, ont leur plus grand diamètre au dessus du milieu ; au dessus de ce niveau, ils se rétrécissent jusqu'au sommet obtus ; au dessous, ils s'atténuent peu à peu jusqu'au tiers inférieur puis conservent jusqu'à la base une largeur presque identique, formant ainsi une sorte de large pseudo-onglet.

L'androcée se compose de dix étamines à filets sublinéaires ; les filets oppositipétales, dont le sommet dépasse l'extrémité supérieure des pétales, sont insérés au dessous du milieu de la corolle ; leur partie soudée est haute de 1·80 à 2 mm. ; leur partie libre est longue de 4·40 à 5·25 mm. Les filets alternipétales sont soudés à la corolle sur une longueur égale à celle du tube de cette dernière ; leur partie libre est haute de 5·40 à 6·80 mm. Ovées-réniformes, aussi hautes que larges, les anthères sont obtuses au sommet et émarginées à la base ; leur longueur varie de 0·50 à 0·60 mm., leur largeur, de 0·50 à 0·60 mm.

Le gynécée se compose de cinq carpelles hauts de 3·60 à 3·80 mm. et atténués, dans leur partie supérieur, en styles assez grêles, longs de 0·80 à 1·40 mm. Dans chaque carpelle, les placentes sont constitués par deux cordons grêles qui courent tout le long des faces internes des carpelles et parallèlement à celles-ci ; ces placentes supportent un petit nombre d'ovules qui semblent bien constitués mais que nous n'avons jamais vu se transformer en graînes.

Aussi hautes que larges, largement obovées-subtrapéziformes, longues de 0·60 à 0·90 mm. et larges de 0·60 à 0·90 mm., les écailles s'atténuent depuis le sommet arrondi et émarginé jusqu'à la base qui n'est, elle même, ni élargie, ni rétrécie.

Le *Sedum Cretini*, que je me fais un plaisir de dédier à mon excellent camarade, le médecin-auxiliaire Cretin, en témoignage de ma sincère amitie, est originaire du Sikkim, où la mission Smith & Cave en a récolté de beaux échantillons mâles, une première fois, le 11 juillet 1909, à une altitude de 3933 mètres dans la vallée de Zemu, une seconde fois, le 12 juillet 1909 à Eumtso La, à une altitude de 4833 mètres. Ces specimens sont conservés dans l'herbier du Jardin Royal de Calcutta, le premier, sous le n° 1206, le second, sous le n° 1299.

Le *Sedum Cretini*, qui appartient à la section *Rhodiola*, se distingue facilement de toutes les espèces de ce groupe par son caudex grêle et stolonifère.

Sedum Someni Raymond-Hamet sp. nova. Planta annua et non steriles caules edens. Radices fibratæ. Caulis floriferus gracilis, glaber, basi simplex et incurvatus deinde ramosus et erectus. Folia alterna, plana, sessilia, infra insertionem in pseudo-calcar integrum et obtusum producta, obovato-oblonga vel suboblonga, marginibus integerrimis sed papillosis, obtusa, paulo longiora quam latiora. Inflorescentia corymbiformis, laxiuscula. Pedicelli glabri. Bracteolæ infra insertionem in calcar productæ ; calcar integrum, obtusum ; lamina ovato-deltoidea, marginibus integerrimis, acuta, longior quam latior. Calyx glaber, segmentis 5, infra insertionem in calcar productis ; calcar integrum, obtusum ; lamina obovata, marginibus integerrimis, apice obtusissima, longior quam latior. Corolla glabra, calyce paulo brevior, segmentis 5, tubo multo longioribus, subsemioblongis, marginibus integerrimis, apice subacutis, longioribus quam latioribus. Stamina 5, glabra ; filamenta oppositipetala nulla ; filamenta alternipetala corollæ medium superantia sed apicem non attingentia, angustissime lineari-subdeltoidea ; antheræ ovato-reniformes, basi emarginatæ, apice obtusæ et cuspidatæ, tam longæ quam latæ. Carpella 5, glabra, apice in stylos carpellis breviores attenuata, placentis a gracili ligamine secundum carpellorum margines disposito, constitutis. Squamæ 5, unguiculatæ : unguicula linearis ; lamina quam unguicula paulo brevior, latissime ovata, apice emarginata. Folliculi 5, erecti, lateribus internis non gibbosis. Semina obovato-oblonga, longiora quam latiora, testa leviter mamillata nucleum non superante.

Le *Sedum Someni* est une plante glabre, annuelle et n'émettant point de rejets stériles. Haute de 12 à 23 cm., assez grêle, érigée mais un peu couchée dans sa partie inférieure, simple à la base mais émettant, à partir d'une faible distance de cette dernière et jusqu'à sa moitié, des rameaux florifères alternes, la tige, dont le diamètre varie de 1·25 à 2·50 mm. à la base et de 1·10 à 1·30 mm. au milieu, porte, des feuilles qui, dans sa partie basilaire, sont très rapprochées les unes des autres et separées par des entrenœuds variant à peine de 1·50 à 1·60 mm., mais qui, dans ses régions médiane et supérieure, ainsi que sur ses rameaux, sont beaucoup plus distantes. Alternes, planes, sessiles, prolongées au dessous de leur insertion en un pseudo-éperon obtus et entier haut de 0·50 à 0·60 mm., obovées-oblongues ou suboblongues, un peu plus hautes que larges ces feuilles, dont les bords sont entiers mais garnis de petites papilles hyalines obtuses et plus ou moins longuement coniques, ont leur plus grand diamètre un peu au dessus du milieu ; au dessus de ce niveau, elles se rétrécissent en un sommet obtus et arrondi ; au dessous, elles s'atténuent jusqu'à la base qui n'est, elle même, ni élargie, ni rétrécie ; leur longueur varie de 3·25 à 7 mm. ; leur largeur, de 2·60 à 8·50 mm.

Corymbiforme, haute de 3 à 5 cm. et large de 3 à 5 cm., l'inflorescence, qui termine la tige et les rameaux, se compose de plusieurs pédoncules primaires alternes, divisés vers leur milieu en deux rameaux divergents sur lesquels s'érigent les pédicelles.

Grêles, glabres et longs de 0·60 à 1·30 mm., les pédicelles portent à la base une bractéole haute de 0·80 mm. et large de 0·40 mm., prolongée au dessous de son insertion en un éperon obtus haut de 0·10 mm. ; plus hautes que larges, ovées-deltoïdes, ces bractéoles, dont les bords sont entiers, ont leur plus grand diamètre à une faible distance de la base ; au dessous de ce niveau, elles se rétrécissent jusqu'à la base ; au dessus, elles s'atténuent jusqu'au sommet aigu.

Le calice se compose de cinq segments prolongés au dessous de leur insertion en un éperon entier et obtus, haut de 0·30 à 0·60 mm. Obovés, plus hauts que larges, longs de 2·50 à 7 mm. et larges de 0·60 à 3 mm., ces segments, dont la longueur varie assez fortement sur une même fleur et dont les bords sont toujours entiers, ont leur plus grande largeur au dessus du milieu ; au dessus de ce niveau ils se rétrécissent en un sommet arrondi et très obtus ; au dessous, ils s'atténuent jusqu'à la base qui n'est, elle même, ni élargie, ni rétrécie.

Plus brève que les grands sépales, la corolle se compose d'un tube haut de 0·15 à 0·25 mm. et de cinq segments beaucoup plus longs que le tube, plus hauts que larges, longs de 3·40 à 4·75 mm. et larges de 1·25 à 2 mm. Subsemioblongs, pourvus extérieurement d'une carène mamilleuse et peu saillante qui court tout le long de leur nervure médiane depuis leur base jusqu'à leur sommet, ces segments, dont les bords sont entiers, ont leur plus grand diamètre un peu au dessus du milieu ; au dessus de ce niveau, ils se rétrécissent peu à peu jusqu'au sommet subaigu où se termine leur carène ; au dessous ils s'atténuent peu à peu jusqu'à une faible distance de la base puis s'élargissent légèrement jusqu'à la base elle-même.

L'androcée se compose de cinq étamines alternipétales, glabres, dont les filets très étroitement linéaires-subdeltoïdes s'atténuent presque insensiblement depuis le sommet jusqu'à la base qui n'est, elle même, ni élargie ni rétrécie ; leur partie soudée est haute de 0·15 à 0·25 mm. ; leur partie libre, longue de 2 à 3 mm., est large de 0·25 à 0·30 mm. à la base et de 0·15 à 0·20 mm. au milieu. Aussi hautes que larges, oveés-réniformes, longues de 0·45 à 0·60 mm. et larges de 0·45 à 0·50 mm., émarginées à la base, les anthères portent, au milieu de leur sommet obtus, une petite cuspide aigue.

Soudés entre eux sur un quart environ de leur longueur totale, les carpelles sont atténués dans leur partie supérieure en styles assez grêles, plus brefs qu'eux et terminés au sommet par des stigmates légèrement dilatés ; leur partie soudée est haute de 0·75 à 1 mm. ; leur partie libre, de 2·50 à 3 mm. ; les styles sont longs de 0·50 mm. Dans chaque carpelle, les placentes, qui portent des ovules sur toute leur longueur, sont constitués par deux cordons grêles qui courent tout le long des faces internes des carpelles et presque parallèlement, quoiqu'un peu incurvés en dedans, à chacun de leurs bords internes.

Plus hautes que larges, les cinq écailles sont constitués par un onglet sublinéaire long de 0·30 à 0·50 mm. et large de 0·15 mm., et par un limbe un peu plus bref que l'onglet, long de 0·20 mm. et large de 0·40 mm., très largement ové et émarginé au sommet.

Les follicules, au nombre de 5, sont appliqués les uns contre les autres et ont des faces internes non gibbeuses.

Obovées-oblongues, plus hautes que larges, longues de 0·50 à 0·60 mm. et larges de 0·20 à 0·25 mm., les graines, dont le nombre dans chaque follicule varie de 24 à 32, sont recouverts d'un test finement mamilleux s'appliquant exactement sur l'amante.

Le *Sedum Someni*, qui est dédié à Monsieur le Docteur H. Somen en témoignage de cordiale gratitude, est originaire du Yun-Nan, où le R. P. Maire en a récolté en octobre et novembre, à une altitude de 2500 m., sur les rochers, les toitures et les vieux murs de Tong-Tchouan trois séries d'échantillons qui sont conservés dans l'herbier de l'Academie Internationale de Géographie botanique.

Il se rapproche beaucoup des *Sedum Roborowskii* Maximowicz,[*] *S. obtusipetalum* Franchet,[†] *S. Moroti* Raymond-Hamet,[‡] et *S. Forresti* Raymond-Hamet,[§] mais s'en distingue pourtant fort aisément.

Du *S. Roborowskii* il diffère : 1°, par son androcée isostémone, et non diplostémone ; 2°, par ses anthères légèrement cuspidées au sommet ; 3°, par ses écailles onguiculées, à onglet linéaire, à limbe un peu plus bref que l'onglet, très largement ové, émarginé au sommet, non point sublinéaires à peine dilatées au sommet.

1°, ses feuilles obovées-oblongues ou suboblongues, et non sublinéaires-subsemioblongues ; 2°, ses sépales obovés, non point sublinéaires-semioblongs ou sublinéaires-suboblongs ; 3°, son androcée isostémone, et non diplostémone ; 4°, ses anthères cuspidées, permettent de le séparer du *S. obtusipetalum.*

Il s'éloigne du *S. Moroti* : 1°, par ses pétales subaigus, non point aigus et mucronés, à mucron dépassant légèrement le sommet du pétale ; 2°, par son androcée isostémone, et non diplostémone ; 3°, par ses anthères cuspidées.

Enfin on ne peut le confondre avec le *S. Forresti* car il possède : 1°, un androcée isostémone, non point diplostémone ; 2°, des anthères alternipétales dépassant le milieu des pétales, et non dépassant un peu le sommet de ces derniers ; 3°, des anthères cuspidées ; 4°, des écailles onguiculées, à onglet linéaire, à limbe un peu plus bref que l'onglet, très largement ové, émarginé au sommet, non point subcylindriques à peine dilatées au sommet; 5°, des ovules à funicule beaucoup plus bref, et non plus longs qu'eux.

Sedum Seelemanni Raymond-Hamet, sp. nova. Planta annua, steriles caules non edens. Radices fibratæ. Caules floriferi glabri, graciles, ramosi, erecti. Folia alterna, sessilia, infra insertionem in calcar producta ; calcar integrum et obtusum ; lamina lineari-semioblonga, marginibus integerrimis, apice obtusa, glabra, longior quam latior. Inflorescentia subcorymbiformis, satis laxa. Bracteæ foliis similes sed eis paulo minores. Pedicelli calyce paulo breviores vel paulo longiores, glabri, graciles. Calyx glaber, segmentis 5, infra insertionem in calcar non productis, tubo multo longioribus, ovatis, marginibus integerrimis, apice subacutis, longioribus quam latioribus. Corolla glabra, calyce paulo brevior, segmentis 5, tubo multo longioribus, semioblongi-subdeltoideis, marginibus integerrimis, apice subacutis, longioribus quam latioribus. Corolla glabra, calyce paulo brevior, segmentis 5, tubo multo longioribus, semioblongi-subdeltoideis, marginibus integerrimis, apice subobtusis, longioribus quam latioribus. Stamina 5, glabra ; filamenta oppositipetala nulla ; filamenta alternipetala longissime angustissimeque lineari-subdeltoidea, corollæ medium paulo superantes. Carpella 5, inter eos basi breviter connata, parte connata parte libera multo breviore, pauciovulata, glabra, in stylos carpellis breviores graciles attenuata. Squamæ 5, longe lineares, apice obtusæ, multo longiores quam latiores. Placentæ a mole semiorbiculari in carpellorum laterum parte inferiore disposito, constitutæ. Folliculi 5, erecti, marginibus internis non gibbosis. Semina obovata, apice leviter cuspidata, testa papillosa duobus extremitatibus nucleum non superante, longiora quam latiora.

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[*] C. J. Maximowicz, Diagn. plant. nov. asiat., in Bull. de l'Acad. Imp. des Sc. de St. Pétersbourg, t. xxix, p. 154 (1883).

[†] A. Franchet, Saxifrag., Crassul. et Combret. nov. e Fl. sin., in Morot, Journ. de Bot., t. x, pp. 289 et 290 (1896).

[‡] Raymond-Hamet, *Sedum* nouv. de l'hb. du Mus., in Bull. Mus. Hist. nat. de Paris, pp. 491–493 (1909).

[§] Raymond-Hamet, Pl. Chin. Forrest., in Notes R. B. Gard. Edinburgh, no. xxiv, pp. 118 et 119, tab. lxxxvi (1912).

Le *Sedum Seelemanni* est une petite plante glabre et annuelle, à racines fibreuses. Haute de 2·50 à 3 cm., érigée et à peine courbée à la base, la tige, dont le diamètre est de 1 mm. à la base et de 0·80 mm. au milieu, est simple dans sa partie inférieure, mais émet, dans sa moitié supérieure, quelques rameaux alternes ; ces rameaux donnent naissance à de courts pédoncules feuillés et alternes, qui tantôt portent à leur extrémité une seule fleur dressée, tantôt supportent deux pédicelles grêles, à peine renflés au sommet, longs de 2 à 4·50 mm.

La tige, les rameaux et les pédoncules portent, sur toute leur longueur, des feuilles alternes, prolongées au dessous de leur insertion en un éperon entier et obtus haut de 0·25 à 0·50 mm. Plus longues que larges, linéaires-semioblongues, hautes de 3 à 3·25 mm. et larges de 1·10 à 1·25 mm., ces feuilles, dont les bords sont entiers, s'élargissent peu à peu depuis le sommet obtus jusqu'au tiers supérieure, puis, à partir de ce niveau, conservent une largeur à peu près identique jusqu'à la base qui n'est, elle même, ni élargie, ni rétrécie.

Le calice se compose d'un tube très bref et de cinq segments ovés, plus longs que larges, hauts de 2·60 à 3·10 mm. et larges de 1·25 à 1·80 mm. ; ces segments, dont les bords sont entiers, ont leur plus grand diamètre au dessous du milieu ; au dessous de ce niveau, ils se rétrécissent jusqu'à la base ; au dessus, ils s'atténuent jusqu'au sommet subaigu.

Un peu plus brève que le calice, la corolle se compose d'un tube long de 0·25 mm. et de cinq segments beaucoup plus longs que le tube ; plus hauts que larges, semioblongs-subdeltoïdes, longs de 2·70 à 2·80 mm. et larges de 1·20 à 1·30 mm., ces segments, dont les bords sont entiers, ont leur plus grande largeur à la base ; à partir de ce niveau, ils se rétrécissent presque insensiblement jusqu'à la moitié, puis plus rapidement jusqu'au sommet subobtus.

L'androcée se compose de cinq étamines alternipétales glabres. Très longuement et très étroitement linéaires-subdeltoïdes, les filets s'élargissent presque insensiblement depuis le sommet jusqu'à la base qui n'est, elle même, ni élargie ni rétrécie ; le sommet de ces filets, qui sont soudés à la corolle sur une longueur égale à celle du tube de cette dernière, c'est à dire, sur une longueur de 0·25 mm., dépasse le milieu des pétales ; leur partie libre, longue de 1·60 à 2 mm., est large de 0·25 mm. à la base et de 0·20 mm. au milieu.

Soudés entre eux sur un quart ou un cinquième environ de leur longueur totale, les carpelles sont atténués en styles grêles, récurvés, plus brefs qu'eux et terminés au sommet par des stigmates dilatés ; leur partie soudée est haute de 0·50 à 0·75 mm. ; leur partie libre, de 2·25 à 2·40 mm. ; les styles sont longs de 0·50 à 0·60 mm. Dans chaque carpelle, les placentes sont constitués par une masse semiorbiculaire disposée dans la partie inférieure des faces internes des carpelles et à peu de distance de leur base.

Beaucoup plus hautes que larges, longuement linéaires, légèrement dilatées et obtuses au sommet, les écailles, qui ne sont ni élargies ni rétrécies à la base, sont longues de 0·90 à 1·10 mm. et larges de 0·10 à 0·15 mm.

Les follicules érigés ont des faces internes non gibbeuses.

Obovées, plus hautes que larges, longues de 1 mm. et larges de 0·45 mm., les graines, dont le nombre varie de 7 à 8 par follicule, portent au sommet un petit appendice subhemisphérique. Le test, que s'applique exactement sur l'amande, est couvert de papilles longuement subconiques et subobtuses au sommet.

Le *Sedum Seelemanni*, qui porte le nom de mon sympathique confrère et ami Monsieur Seelemann, est originaire du Kumaun où, le 6 septembre 1884, J. F. Duthie en a récolté, près du glacier de Lebung, quelques échantillons qui sont conservés, dans l'herbier de Kew, sous le n° 2919.

Il trouve sa place dans le petit groupe homogène formé par les *Sedum perpusillum* Hooker f., & Thomson,[*] *S. Przewalskii* Maximowicz,[†] *S. Henrici Roberti* Raymond-Hamet,[‡] *S. Fischeri* Raymond-Hamet,[§] *S. Fedtschenkoi* Raymond-Hamet,[||] et *S. Magæ* Raymond-Hamet,[¶] mais ne peut être confondu avec aucune de ces espèces.

Il diffère, en effet, du *S. perpusillum :* 1°, par ses feuilles linéaires-semioblongues, obtuses, et non obovées, aigues ; 2°, par ses sépales non prolongés au dessus de leur insertion, ovés, subaigus, non point obovés, aigus ; 3°, par ses placentes formés d'une masse semiorbiculaire disposée dans la partie inférieure des faces internes des carpelles et à peu de distance de leur base, et non constitués par un filament-grêle qui court tout le long des bords internes des carpelles et parallèlement à ceux-ci.

Du *S. Przewalskii*, il se distingue : 1°, par ses sépales plus larges et moins obtus ; 2°, par ses graines couvertes de papilles, non point de mamilles.

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[*] Hooker f., & Thomson, Præcurs. ad fl. Ind., in Journ. of the Proceed. of the Linn. Soc., Bot., t. i, p. 103 (1858).

[†] C. J. Maximowicz, Diagn. plant. nov. asiat., in Bull. de l'Acad. des Sc. de St. Pétersbourg, t. xxix, p. 156 (1883).

[‡] Raymond-Hamet, Sur 3 *Sedum* nouveaux du Chumbi et du Mexique, in Fedde, Repert. nov. spec., t. xii, p. 407–409 (1913).

[§] Raymond-Hamet, Sur 2 *Sedum* nouv. de l'hb. du J. B. I. de Pierre le Grand, in Русскій Ботаническій Журналъ, (1914).

[||] Raymond-Hamet, loco citato, (1914).

[¶] Raymond-Hamet, Sur un nouv. *Sedum* du Kumaun, in Fedde, Repert. nov. spec., t. xiii, pp. 349–351 (1914).

1°, ses feuilles linéaires-semioblongues, obtuses, et non étroitement subobovées-linéaires, aigues ; 2°, ses sépales non prolongés en éperon au dessous de leur insertion, plus larges, subaigus, non point aigus au sommet ; 3°, son androcée isostémone, et non diplostémone ; 4°, ses carpelles très brièvement, non point très longuement soudés entre eux ; 5°, ses placentes formés d'une masse semiorbiculaire disposée à la partie inférieure des faces internes des carpelles et à peu de distance de leurs bords, et non constitués par un filament grêle qui court tout le long des bords internes des carpelles et presque parallèlement à ceux-ci, la séparent du *S. Henrici Roberti.*

1°, ses feuilles obtuses, non point aigues ; 2°, ses sépales subaigus, et non aigus ; 3°, ses placentes formés d'une masse semiorbiculaire disposée à la partie inférieure des faces internes des carpelles et à peu de distance de leurs bords, non point constitués par un filament grêle qui court tout le long des bords internes des carpelles et parallèlement à ceux-ci ; 4°, ses graines papilleuses, et non mamilleuses, permettent de le separer du *S. Fischeri.*

Il s'éloigne du *S. Fedtschenkoi* : 1°, par ses feuilles obtuses, non point aigues ; 2°, par ses sépales non prolongés au dessous de leur insertion, ovés, subaigus, et non linéaires-lancéolés ou linéaires-subobovés, aigus au sommet ; 3°, par son androcée isostémone, non point diplostémone ; 4°, par ses écailles longuement linéaires, légèrement dilatées au sommet, beaucoup plus hautes que larges, et non subcylindriques, nettement dilatées et un peu concaves au sommet, deux fois plus hautes que larges.

On ne peut le confondre, enfin, avec le *S. Magæ*, car il possède : 1°, des feuilles linéaires-semioblongues, obtuses, non point obovées, aigues ; 2°, des sépales non prolongés au dessous de leur insertion, ovés, subaigus, et non obovés, aigus ; 3°, des pétales semioblongs-subdeltoïdes, non point subonguiculés, à onglet linéaire et à limbe ové ; 4°, des placentes formés d'une masse semiorbiculaire disposée à la partie inférieure des faces internes des carpelles, et non constitués par un cordon grêle qui court tout le long des bords internes des carpelles et presque parallèlement à ceux-ci ; 5°, des graines couvertes de papilles étroitement subconiques plus hautes que larges, non point de mamilles subhémisphériques.

On trouvera, d'ailleurs, dans le tableau analytique suivant, un essai de classification du groupe que la découverte du *S. Seelemanni* vient d'accroître d'une unité.

Sedum Dugueyi Raymond-Hamet sp. nova. Planta perennis, steriles caules edens. Radices fibratæ. Caules floriferi graciles, glabri, basi repentes et ramosi, deinde erecti et simplices. Caulium sterilium folia alterna, glabra, sessilia, infra insertionem in calcar producta ; calcar integrum, obtusum vel emarginatum ; lamina longiuscule ovato-deltoidea, marginibus integris, apice acuta et acuminata, longior quam latior. Caulium floriferorum folia alterna, glabra, sessilia, infra insertionem in pseudo-calcar producta ; pseudo-calcar obtusum, integrum ; lamina longe ovato-deltoidea, marginibus integris, apice acuta et acuminata, longior quam latior.

- Carpelles très longuement soudés entre eux à la base, à partie libre plus brève que la partie soudée . . . . *S. Henrici Roberti.*
- Carpelles brièvement soudés entre eux à la base, à partie libre plus longue que la partie soudée . . .
  - Placente formé d'une masse semiorbiculaire disposée dans la partie inférieure des carpelles et à peu de distance de leurs bords . . .
    - Graines couvertes de papilles étroitement subconiques plus hautes que larges . . . . S. Seelemanni.
    - Graines couvertes de mamilles subhémisphériques . .
      - Feuilles obtuses. Sepales longuement ovés ou étroitement subdeltoïdes-linéaires-semioblongs, obtus, non prolongés en éperon au dessous de leur insertion. Androcée isostémone. Ecailles beaucoup plus hautes que larges, étroitement linéaires-subobovées . . . . *S. Przewalskii.*
      - Feuilles aigues. Sépales linéaires-lancéolés ou linéaires-subobovés, aigus, prolongés en éperon au dessous de leur insertion. Androcée diplostémone. Ecailles deux fois plus hautes que larges, subcylindriques, nettement dilatées et un peu concaves au sommet . . . . *S. Fedtschenkoi.*
  - Placente constitué par un cordon grêle qui court tout le long des bords internes des carpelles et presque parallèlement à ceux-ci . . . .
    - Graines couvertes de papilles étroitement subconiques plus hautes que larges . . . . *S. perpusillum.*
    - Graines couvertes de mamilles subhémisphériques .
      - Sépales prolongés en éperon au dessous de leur insertion. Pétales subonguiculés, à onglet linéaire et à limbe ové . . . *S. Magæ.*
      - Sépales non prolongés en éperon au dessous de leur insertion. Pétales suboblongs, légèrement contractés au dessous du milieu et faiblement dilatés vers la base . . . . . *S. Fischeri.*

Inflorescentia paniculiformis, laxiuscula. Pedicelli glabri. Bracteæ caulium floriferorum foliis similes sed eis paulo minores, glabræ. Calyx glaber, segmentis 5, infra insertionem in calcar productis ; calcar integrum, obtusum ; lamina longe ovata, marginibus integris, apice acuto-acuminata, longior quam latior. Corolla glabra, calyce paulo longior, segmentis 5, tubo multo longioribus, ovatis, marginibus integerrimis, apice acutis et aristatis, arista petali apicem longe superante, longioribus quam latioribus. Stamina 10, glabra ; filamenta longissime et angustissime deltoidea, oppositipetala infra corollæ medium inserta ; antheræ ovato-reniformes, basi emarginatæ, apice obtusæ, paulo longiores quam latiores. Carpella 5, glabra, apice in stylos carpellis paulo breviores attenuata, placentis a gracili ligamine secundum carpellorum margines disposito constitutis. Squamæ 5, unguiculatæ, unguicula lineari, lamina quam unguicula paulo breviore, late subovato-subtrapezoidea, apice emarginata. Folliculi 5, suberecti, lateribus internis non gibbosis.

Le *Sedum Dugueyi* est une plante glabre et vivace. Grêle, haute de 6·50 cm., la tige florifère est simple et érigée sauf dans sa partie basilaire, où elle est rampante et où elle émet des rejets stériles.

Les rejets stériles portent, sur presque toute leur longueur, des feuilles alternes très rapprochées les unes des autres et prolongées, au dessous de leur insertion, en un éperon haut de 0·60 mm., entier, amplexicaule, obtus ou émarginé. Assez longuement ovées-deltoïdes, plus hautes que larges, longues de 2·50 mm. et larges de 1·45 mm., ces feuilles, dont les bords sont entiers, ont leur plus grand diamètre à une faible distance de la base ; au dessous de ce niveau, elles se rétrécissent jusqu'à la base qui n'est, elle même, ni élargie, ni rétrécie ; au dessus, elles se rétrécissent assez rapidement jusqu'un peu au dessous du milieu, puis s'atténuent plus lentement jusqu'au sommet aigu où elles se prolongent en un long acumen.

Les tiges florifères portent, sur toute leur longueur, des feuilles alternes assez distantes les unes des autres et prolongées au dessous de leur insertion en un pseudo-éperon, haut de 0·75 mm., obtus, entier et amplexicaule. Longuement ovées-deltoïdes, plus hautes que larges, longues de 3·60 mm. et larges de 1·25 mm., ces feuilles, dont les bords sont entiers, ont leur plus grande largeur à une faible distance de leur base ; au dessous de ce niveau, elle se rétrécissent jusqu'à la base qui n'est, elle même, ni élargie ni rétrécie ; au dessus, elles se rétrécissent assez rapidement jusqu'un peu au dessous du milieu, puis s'atténuent plus lentement jusqu'au sommet aigu où elles se prolongent en un long acumen.

L'inflorescence paniculiforme, qui termine la tige, se compose d'un petit nombre de pédoncules primaires, alternes, feuillés et portant une seule fleur érigée.

Le calice se compose de cinq segments prolongés, au dessous de leur insertion, en un éperon entier, obtus, haut de 0·25 à 0·35 mm. Longuement ovés, plus hauts que larges, longs de 4·10 à 5·50 mm. et larges de 1·20 à 1·50 mm., ces segments, dont les bords sont entiers, ont leur plus grand diamètre à une faible distance de la base ; au dessous de ce niveau, ils se rétrécissent jusqu'à la base qui n'est, elle même, ni élargie ni rétrécie ; au dessus, ils s'atténuent peu à peu jusqu'au sommet aigu où ils se prolongent en un long acumen.

Un peu plus longue que le calice, la corolle se compose d'un tube haut de 0·15 à 0·25 mm. et de cinq segments beaucoup plus longs que le tube, plus hauts que larges, longs de 6·50 à 7·60 mm. et larges de 2 à 2·20 mm. Nettement ovés, pourvus extérieurement d'une carène peu saillante, qui court tout le long de leur nervure médiane depuis leur base jusqu'un peu au dessus de leur sommet, ces segments, dont les bords sont entiers, ont leur plus grande largeur au dessous du milieu ; au dessous de ce niveau, ils se rétrécissent jusqu'à la base qui n'est, elle même, ni élargie, ni rétrécie ; au dessus, ils s'atténuent peu à peu jusqu'au sommet aigu que dépasse nettement l'extrémité supérieure de la carène médiane prolongée en une longue ariste aigue.

L'androcée se compose de dix étamines, glabres, dont les filets très longuement et très étroitement deltoïdes s'élargissent presque insensiblement depuis le sommet jusqu'à la base qui n'est, elle même, ni élargie, ni rétrécie ; les filets oppositipétales, dont le sommet atteint presque ou dépasse légèrement le milieu des pétales, sont insérés au dessous du milieu de la corolle ; leur partie soudée est haute de 0·60 à 1 mm. ; leur partie libre, longue de 2·10 à 3·50 mm., est large de 0·40 mm. à la base et de 0·12 mm. au milieu. Les filets alternipétales sont soudés à la corolle sur une longueur égale à celle du tube de cette dernière, c'est à dire, sur une longueur variant de 0·15 à 0·25 mm. ; leur partie libre, haute de 3 à 4·25 mm., est large de 0·50 mm. à la base et de 0·15 mm. au milieu. Ovées-subréniformes, un peu plus hautes que larges, longues de 0·75 à 0·85 mm. et larges de 0·50 à 0·60 mm., les anthères sont émarginées à la base et obtuses au sommet.

Soudés entre eux sur un quart ou un cinquième environ de leur longueur totale, les carpelles sont atténués, dans leur partie supérieure, en styles grêles un peu plus longs ou de même longueur que leur partie libre et terminés par des stigmates légèrement dilatés ; leur partie soudée est haute de 0·75 mm. ; leur partie libre, de 2·10 à 3 mm. ; les styles sont longs de 2·25 à 3 mm. Dans chaque carpelle, les placentes, qui portent des ovules sur toute leur longueur, sont constitués par deux cordons grêles qui courent tout le long des faces internes des carpelles et presque parellèlement, quoique nettement incurvés en dedans, à chacun de leurs bords internes.

Les écailles se composent d'un petit onglet linéaire haut de 0·40 mm. et large de 0·15 mm., et d'un limbe un peu plus bref que l'onglet, largement subové-trapéziforme, émarginé au sommet, haut de 0·25 mm. et large de 0·25 mm.

Les follicules, qui sont subérigés, ont des faces internes non gibbeuses.

Longuement obovées, les graines, non mures, sont recouvertes d'un test qui s'applique exactement sur l'amande.

Le *Sedum Dugueyi*, qui est dédie à M. l'Adjudant-Chef Duguey, en témoignage de très amicale sympathie, est originaire de la Chine occidentale où, en août 1903, E. H. Wilson, en a récolté quelques échantillons qui sont conservés dans l'herbier de Kew, sous le n° 3632A.

Il trouve sa place dans la série que, sous le nom de *Japonica*, Maximowicz[*] a établie dans la section *Seda genuina* Koch. Cette série, que de récentes découvertes ont considérablement accrue, se compose actuellement de vingt-neuf espèces.

Les *Sedum lineare* Thunberg, *S. sarmentosum* Bunge, *S. chrysastrum* Hance, *S. subtile* Miquel, *S. japonicum* Sieboldt, *S. Alfredi* Hance, *S. Sheareri* Moore, *S. polytrichoides* Hemsley, *S. Makinoi* Maximowicz, *S. oryzifolium* Makino, *S. hakonense* Makino, *S. kiusianum* Makino, *S. australe* Merrill et *S. morrisonense* Hayata, qui sont originaires du Japon, de la Chine orientale et des Iles Philippines et sont encore aujourd'hui imparfaitement délimités, n'ont avec notre plante que de lointains rapports.

Par contre, les *Sedum multicaule* Wallich,[†] *S. trullipetalum* Hooker f., & Thomson,[‡] *S. platysepalum* Franchet,[§] *S. Barbeyi* Raymond-Hamet[||] *S. Beauverdi* Raymond-Hamet[¶] *S. Daigremontianum* Raymond-Hamet,[**] *S. Oreades* Raymond-Hamet,[††] *S. Heckeli* Raymond-Hamet,[‡‡] *S. Susannæ* Raymond-Hamet,[§§] *S. Feddei* Raymond-Hamet,[||||] *S. Rosei* Raymond-Hamet,[¶¶] *S. Gagei* Raymond-Hamet,[***] *S. Pampaninii* Raymond-Hamet,[†††] et *S. Celiæ* Raymond-Hamet,[‡‡‡] qui croissent au Sikkim et en Chine occidentale et sont actuellement fort bien connus, ont avec le *S. Dugueyi* de si étroites affinités qu'il est indispensable de faire connaître les caractères qui permettent de séparer, de chacun d'eux, notre nouvelle espèce.

[*] C. J. Maximowicz, Diagn. plant. nov. asiat., in Bull. de l'Acad. Imp. des Sc. de St. Pétersbourg, t. xxix, 148–154 (1883).

[†] Wallich, Cat. n. 7232, ex Hooker f., & Thomson, Præcurs. ad fl. Ind., in Journ. of the Linn. Soc., Bot., t. i, pp. 102 et 103 (1857).

[‡] Hooker f., & Thomson, *loco citato*, p. 102 (1857).

[§] A. Franchet, Saxifrag., Crassul. et Combret. nov. e Fl. sin., in Morot, Journ. de Bot., t. x, p. 289 (1896).

[||] Raymond-Hamet, Seda nova v. min. cogn., in Bull. Soc. Bot. France, t. lvi, pp. 48–50 (1909).

[¶] Raymond-Hamet, *loco citato*, pp. 45–47 (1909).

[**] Raymond-Hamet, *Sedum Daigremontianum*, sp. n., in Bull. Soc. Bot. France, t. lvi, pp. 234–236 (1909).

[††] Raymond-Hamet, Obs. s. le *Sedum Oreades*, n.n., in Bull. Soc. Bot. France, t. lvi, pp. 571–575 (1909).

[‡‡] Raymond-Hamet, *Sedum Chauveaudi*, *S. Heckeli*, sp. nov., in Lecomte, Notul. systemat. (1910).

[§§] Raymond-Hamet, Nouv. asiat. du g. *Sedum*, in Fedde, Repert. nov. spec., t. viii, pp. 24–25 (1910).

[||||] Raymond-Hamet, *loco citato*, pp. 25–27 (1910).

[¶¶] Raymond-Hamet, Ub. zw. n. chines. *Sedum*, in Beibl. 101 zu Engler, Bot. Jahrb., t. xlix, pp. 32–33 (1910).

[***] Raymond-Hamet, Note s. 2 esp. nouv. de *Sedum*, in Fedde, Repert. nov. spec., t. viii, pp. 263–265 (1910).

[†††] Raymond-Hamet, Sur 2 *Sedum* nouv. de l'hb. de Firenze, in Malpighia, t. xxvi, p. 59–63 (1913).

[‡‡‡] Raymond-Hamet, Sur un nouv. *Sedum* du Yun Nan, in Bull. de l'Acad. Internat. de Géographie botanique, t. xxiii, pp. 63–70 (1913).

Le *S. Dugueyi* se distingue du *S. multicaule :* 1°, par les feuilles élargies dans leur partie inférieure ; 2°, par les sépales prolongés au dessous de leur insertion ; 3°, par les follicules à faces internes non gibbeuses.

Du *S. trullipetalum*, il diffère : 1°, par les sépales prolongés au dessous de leur insertion, longuement ovés, et non largement lancéolés ; 2°, par les pétales ovés, non point onguiculés, à onglet linéaire un peu plus bref que le limbe ové ; 3°, par les filets oppositipétales à partie soudée plus brève que la partie libre, et non plus longue que cette dernière ou de même longueur qu'elle ; 4°, par les carpelles à partie soudée plus brève que la partie libre, non point plus longue.

1°, les feuilles beaucoup plus rapprochées sur les rejets stériles ; 2°, les sépales longuement ovés, et non oblongs ou obovés oblongs ; 3°, les pétales ovés, non point oblongs-lancéolés, permettent de le séparer du *S. platysepalum.*

1°, les sépales prolongés au dessous de leur insertion, longuement ovés, et non longuement lancéolés ; 2°, les pétales nettement ovés, aristés, à ariste dépassant longuement leur sommet, non point linéaires-subovés-oblongs, mucronés, à mucron atteignant ou ne dépassant que très légèrement leur sommet, le séparent du *S. Barbeyi.*

Il s'éloigne du *S. Beauverdi :* 1°, par les feuilles à éperon obtus ou émarginé, et non lobé, à lobes crénelés ou fimbriés ; 2°, par les sépales prolongés au dessous de leur insertion, longuement ovés, non point linéaires ou linéaires-deltoïdes, dilatés à la base ; 3°, par les pétales aristés, à ariste dépassant longuement leur sommet, et non mucronés, à mucron atteignant seulement ce niveau.

Il est nettement distinct du *S. Daigremontianum :* 1°, par les feuilles longuement ovées-deltoïdes, non point linéaires ; 2°, par les pétales à bords entiers, et non rongés ; 3°, par les filets oppositipétales à partie libre plus longue que la partie soudée, non point plus brève ; 4°, par les écailles onguiculés, à onglet linéaire un peu plus long que le limbe largement subové-subtrapéziforme émarginé au sommet, et non subcylindriques à peine renflées au sommet.

On ne peut le confondre avec le *S. Oreades* car il possède ; 1°, des feuilles longuement ovées-deltoïdes, non point obovées-lancéolées atténuées depuis le tiers supérieur jusqu'à la base non dilatée ; 2°, des sépales longuement ovés, et non obovés-lancéolés atténués depuis le tiers supérieur jusqu'à la base non dilatée ; 3°, des pétales moins longuement soudés entre eux à la base, ovés, à bords entiers, non point obovés-oblongs, à bords rongés ; 4°, des filets oppositipétales à partie soudée plus brève que la partie libre, et non un peu plus longue ou de même longueur qu'elle ; 5°, des écailles onguiculées, à onglet linéaire un peu plus long que le limbe largement subové-subtrapéziforme, émarginé au sommet, non point linéaires-subcylindriques, légèrement dilatées au sommet.

1°, les sépales longuement ovés, et non linéaires ; 2°, les pétales ovés, aristés, non point oblongs-lancéolés, aigus ; 3°, les follicules à faces internes non gibbeuses, l'éloignent du *S. Heckeli.*

Il est bien différent du *S. Susannæ :* 1°, par les sépales prolongés au dessous de leur insertion, ovés, et non sublinéaires; 2°, par les pétales ovés, non point oblongs-lancéolés ; 3°, par les carpelles à placentes fortement incurvés en dedans, et non parallèles à chacun des deux bords internes des carpelles.

On peut le distinguer du *S. Feddei* : 1°, par les feuilles longuement ovés-deltoïdes rétrécies dans leur partie inférieure, non point deltoïdes, non rétrécies dans leur partie inférieure ; 2°, par les pétales ovés, et non obovés-oblongs ; 3°, par les filets oppositipétales à partie soudée plus brève que leur partie libre, non point plus longue ; 4°, par les écailles onguiculées, à onglet linéaire un peu plus long que le limbe largement subové-subtrapéziforme, émarginé au sommet, et non subcylindriques légèrement dilatées au sommet.

1°, les feuilles longuement ovées deltoïdes, non point sublinéaires ou longuement deltoïdes-linéaires ; 2°, les sépales longuement ovés, et non sublinéaires ou longuement deltoïdes-linéaires ; 3°, les pétales ovés, non point oblongs-lancéolés ; 4°, les carpelles à placentes fortement incurvés en dedans, et non parallèles à chacun des leurs deux bords internes, le différencient du *S. Rosei.*

1°, les feuilles et les sépales à bords lisses, non point papilleux ; 2°, les carpelles à partie soudée plus brève, et non plus longue que la partie libre, le distinguent du *S. Gagei.*

Du *S. Pampaninii* il est fort éloigné : 1°, par les feuilles longuement ovées-deltoïdes, non point linéaires : 2°, par les sépales longuement ovés, et non linéaires ou longuement ovés-linéaires ; 3°, par les pétales ovés, aristés, à ariste dépassant leur sommet, non point lancéolés, mucronés, à mucron ne dépassant pas ce niveau ; 4°, par les carpelles à partie soudée beaucoup plus brève que la partie libre, et non à peine plus brève ; 4°, par les graines à test mamilleux, non point papilleux.

Enfin, il s'écarte beaucoup du *S. Celiæ :* 1°, par les feuilles longuement ovées-deltoïdes, et non sublinéaires ; 2°, par les sépales prolongés au dessous de leur insertion ; 3°, par les placentes formés d'un grêle ligament qui court tout le long des faces internes des carpelles et presque parallèlement, quoique nettement incurvés en dedans, à chacun de leurs bords internes, non point constitués par une petite masse semiorbiculaire disposée à la base des faces carpellaires à peu de distance de leurs bords internes.

Voici, d'ailleurs, sous forme de tableau analytique, un essai de classification rationnelle de ce groupe fort homogène.

Sedum Bonnafousi Raymond-Hamet sp. nova.—Planta perennis, steriles ramos raro edens. Caudex glaber, robustiusculus, quando juvenis simplex et erectus, quando vetus, in parte inferiore repens, et, erectos, scapigeros sterilesque ramos, edens, semper apice duo folia opposita infra insertionem in calcar non producta, plana, sessilia, glabra, paulo longiora quam latiora vel latiora quam longiora, marginibus subintegris vel subcrenatis, orbiculari-oblonga vel late orbiculari-ovata, ferens, quando scapigerus centro duorum foliorum terminalium caulem floriferum gracilem glabrum et erectum, emittens. Caulium floriferorum

- Carpelles peu soudés entre eux à la base (partie soudée plus brève que la partie libre), étalés-divergents, à faces internes gibbeuses .
  - Feuilles non dilatées à la base. Sépales non prolongés au dessous de leur insertion. Pétales aristés à ariste dépassant longuement leur sommet . . . . *S. multicaule.*
  - Feuilles nettement dilatées à la base. Sépales prolongés au dessous de leur insertion en un éperon obtus. Pétales aigus . . . . *S. Heckeli.*
- Filets oppositipétales à partie soudée plus longue que leur partie libre, rarement de même longueur que cette dernière .
  - Pétales à bords entiers . . . . *S. Feddei.*
  - Pétales à bords rongés . .
    - Feuilles à éperon entier, à limbe obové-lancéolé, aigu. Sépales prolongés en éperon au dessous de leur insertion, obovés-lancéolés. Pétales largement obovés-oblongs, obtusiuscules, mucronés, à mucron atteignant le sommet des pétales . . . . *S. Oreades.*
    - Feuilles à éperon trilobé, à limbe linéaire, acuminé. Sépales non prolongés en éperon au dessous de leur insertion, linéaires. Pétales ovés-lancéolés, aristés, à ariste dépassant le sommet des pétales . . . . . . *S. Daigremontianum.*
    - Feuilles sublinéaires ou longuement ové-linéaire. Sépales sublinéaires. Pétales subaigus, aristés, à ariste dépassant longuement le sommet des pétales . . . . . . *S. Susannæ.*
  - Placente constitué par une petite masse semiorbiculaire disposée à la base des faces carpellaires à peu de distance de leurs bords internes . . . . *S. Celiæ.*
- Carpelles longuement soudés entre eux à la base (partie soudée plus longue que la partie libre, rarement de même longueur que cette dernière), érigés ou subérigés, à faces internes non gibbeuses
  - Sépales non prolongés en éperon au dessous de leur insertion. Pétales très nettement onguiculés . *S. trullipetalum.*
  - Sépales prolongés en éperon au dessous de leur insertion. Pétales quelquefois atténués dans leur partie inférieure mais jamais onguiculés .
    - Feuilles et sépales à bords lisses. Sépales linéaires, légèrement cuspidés au sommet. Pétales linéaires-lancéolés, subaigus et mucronés au sommet, à mucron ne dépassant pas le sommet du pétale . . . . . . *S. Pampaninii.*
    - Feuilles et sépales à bords garnis de longues papilles. Sépales ovés-linéaires, acuminés au sommet. Pétales ovés-lancéolés, souvent atténués dans leur partie inférieure, aigus et aristés au sommet, à ariste dépassant nettement le sommet du limbe . . . . *S. Gagei.*

- Carpelles peu soudés entre eux à la base (partie soudée plus brève que la partie libre), étalés-divergents, à faces internes gibbeuses .
  - Feuilles non dilatées à la base. Sépales non prolongés au dessous de leur insertion. Pétales aristés à ariste dépassant longuement leur sommet . . . . *S. multicaule.*
  - Feuilles nettement dilatées à la base. Sépales prolongés au dessous de leur insertion en un éperon obtus. Pétales aigus . . . . *S. Heckeli.*
- Carpelles peu soudés entre eux à la base (partie soudée plus brève que leur partie libre), érigés ou subérigés, à faces internes non gibbeuses
  - Filets oppositipétales à partie soudée plus longue que leur partie libre, rarement de même longueur que cette dernière .
    - Pétales à bords entiers . . . . *S. Feddei.*
    - Pétales à bords rongés . .
      - Feuilles à éperon entier, à limbe obové-lancéolé, aigu. Sépales prolongés en éperon au dessous de leur insertion, obovés-lancéolés. Pétales largement obovés-oblongs, obtusiuscules, mucronés, à mucron atteignant le sommet des pétales . . . . *S. Oreades.*
      - Feuilles à éperon trilobé, à limbe linéaire, acuminé. Sépales non prolongés en éperon au dessous de leur insertion, linéaires. Pétales ovés-lancéolés, aristés, à ariste dépassant le sommet des pétales . . . . . *S. Daigremontianum.*
  - Filets oppositipétales à partie soudée plus brève que leur partie libre . . .
    - Placentes formés d'un grêle cordon qui court tout le long des faces internes des carpelles et parallèlement, ou presque parallèlement (parceque légèrement incurvés en dedans) à leurs bords internes .
      - Sépales prolongés en éperon au dessous de leur insertion . .
        - Feuilles sublinéaires ou longuement linéaires-deltoides, à peine dilatées à la base, acuminées au sommet. Sépales sublinéaires ou longuement deltoides-linéaires, acuminés au sommet. Pétales oblongs-lancéolés, subaigus et aristés, à ariste dépassant nettement le sommet du pétale. Placentes parallèles à chacun des deux bords internes des carpelles . . . *S. Rosei.*
        - Feuilles-linéaires-lancéolées, nettement dilatées à la base, aigues au sommet. Sépales obovés-lancéolés ou oblongs-lancéolés, acuminés au sommet. Pétales lancéolés, aigus et mucronés au sommet, à mucron dépassant un peu le sommet du pétale. Placentes presque parallèles, mais un peu incurvés en dedans, à chacun des deux bords internes des carpelles . . *S. platysepalum*
        - Feuilles longuement ovées-deltoides, nettement dilatées à la base, acuminées au sommet. Sépales longuement ovés, aigus et aristés au sommet, à ariste dépassant longuement leur extrémité supérieure. Placentes presque parallèles, mais très nettement incurvés en dedans, à chacun des deux bords internes des carpelles . . . . S. Duoueyi.
      - Sépales non prolongés en éperon au dessous de leur insertion .
        - Feuilles très rapprochées les unes des autres, à éperon lobé à lobes crénelés ou fimbriés, à limbe linéaire. Sépales linéaires ou linéaires-deltoides. Pétales aigus, mucronés, à mucron ne dépassant pas le sommet des pétales . . *S. Beauverdi.*
        - Feuilles rapprochées les unes des autres, à éperon entier, à limbe largement lancéolé. Sépales largement lancéolés. Pétales aigus, mucronés, à mucron ne dépassant pas ou dépassant à peine le sommet des pétales . . . . *S. Barbeyi.*
        - Feuilles assez distantes les unes des autres, à éperon subentier, à limbe ové-linéaire. Sépales sublinéaires. Pétales subaigus, aristés, à ariste dépassant longuement le sommet des pétales . . . . . *S. Susannæ.*
    - Placente constitué par une petite masse semiorbiculaire disposée à la base des faces carpellaires à peu de distance de leurs bords internes . . . . *S. Celiæ.*
- Carpelles longuement soudés entre eux à la base (partie soudée plus longue que la partie libre, rarement de même longueur que cette dernière), érigés ou subérigés, à faces internes non gibbeuses
  - Sépales non prolongés en éperon au dessous de leur insertion. Pétales très nettement onguiculés . *S. trullipetalum.*
  - Sépales prolongés en éperon au dessous de leur insertion. Pétales quelquefois atténués dans leur partie inférieure mais jamais onguiculés .
    - Feuilles et sépales à bords lisses. Sépales linéaires, légèrement cuspidés au sommet. Pétales linéaires-lancéolés, subaigus et mucronés au sommet, à mucron ne dépassant pas le sommet du pétale . . . . *S. Pampaninii.*
    - Feuilles et sépales à bords garnis de longues papilles. Sépales ovés-linéaires, acuminés au sommet. Pétales ovés-lancéolés, souvent atténués dans leur partie inférieure, aigus et aristés au sommet, à ariste dépassant nettement le sommet du limbe . . . . *S. Gagei.*

folia alterna, plana, sessilia, glabra, infra insertionem in calcar non producta, obovato-oblonga, marginibus integris, apice acuta, longiora quam latiora. Inflorescentia paniculiformis, laxiuscula. Pedicelli calyce longiores, glabri. Calyx glaber, segmentis 5, tubo longioribus, infra insertionem in calcar non productis, deltoideis, marginibus integerrimis, basi leviter dilatatis, apice acutis, paulo longioribus quam latioribus. Corolla glabra, calyce longior, segmentis 5, tubo multo longioribus, ovatis, marginibus integerrimis, apice acutis et leviter mucronatis, mucrone petali apicem paulo superante, longioribus quam latioribus. Stamina 10, glabra; filamenta longissime et angustissime deltoidei-linearia, infra corollæ medium inserta; antheræ subovato-reniformes, basi emarginatæ, apice obtusissimæ, paulo longiores quam latiores. Carpella 5, glabra, apice in stylos carpellis breviores graciles attenuata, placentis a gracili ligamine secundum carpellorum margines disposito, constitutis. Squamæ 5, obovato-subtrapezoideæ, apice leviter emarginatæ, basi levissime dilatatæ, paulo longiores quam latiores, vel tam longæ quam latæ, vel etiam paulo latiores quam longiores. Folliculi 5, erectiusculi, lateribus internis non gibbosis. Semina obovato-oblonga, longiora quam latiora, testa lævi nucleum duabus extremitatibus superante.

Le *Sedum Bonnafousi* est une plante glabre et vivace. Dans les plantes jeunes, le caudex simple est érigé mais un peu courbé à la base. Dans les plantes âgées, les parties basilaires du caudex, devenues rampantes, émettent un (ou plusieurs?) rameau florifère érigé et un (ou plusieurs?) rameau stérile également érigé. La hauteur du caudex varie de 5·50 à 9 cm.; son diamètre, qui est de 4 à 8 mm. au milieu, oscille à la base entre 6 et 10 mm. Les rameaux stériles, hauts de 3 cm., ont un diamètre de 2·50 mm.

Quoiqu'on observe quelquefois, dans leur partie supérieure, une ou deux larges cicatrices foliaires subsemiorbiculaires, le caudex et ses rameaux paraissent être le plus souvent nus sur toute leur longueur, sauf au sommet où ils portent toujours une paire de feuilles opposées, non prolongées en éperon au dessous de leur insertion, planes, sessiles et nettement amplexicaules. Un peu plus hautes que larges ou un peu plus larges que hautes, longues de 44 à 95 mm. et larges de 35·50 à 100 mm., ces feuilles, dont les bords sont presque entiers ou garnis de larges crénelures obtuses régulières et séparées par des sinus anguleux, sont tantôt orbiculaires-oblongues, tantôt largement orbiculaires-ovées; dans le premier cas, à partir du niveau de leur plus grande largeur, qui se trouve vers leur milieu, elles se rétrécissent, d'une part vers le sommet très obtus, d'autre part vers la base qui n'est, elle même, ni élargie, ni contractée; dans le second cas, leur plus grand diamètre se trouve au dessous du milieu; au dessus de ce niveau, elles se rétrécissent jusqu'au sommet subaigu; au dessous, elles se rétrécissent jusqu'à la base qui n'est, elle même, ni élargie ni contractée.

Au centre de la paire de feuilles qui le termine, le caudex émet une tige florifère érigée dont le diamètre bien inférieur à celui du caudex varie de 2 à 2·50 mm. à la base et de 1·40 à 1·50 mm. au milieu. En outre, il émet quelquefois, au dessous de la paire de feuilles terminales, une seconde tige florifère qui nait alors à l'aisselle d'une des cicatrices foliares que, comme nous l'avons dit plus haut, on observe parfois à sa partie supérieure. Haute de 10 à 28 cm., la tige florifère porte, sur toute sa longueur, des feuilles alternes, assez espacées, planes et sessiles. Obovées-oblongues, plus hautes que larges, longues de 8 à 10 mm., et larges de 2·50 à 4·25 mm., ces feuilles, dont les bords sont entiers, ont leur plus grande largeur un peu au dessus du milieu ; au dessus de ce niveau, elles se rétrécissent jusqu'au sommet aigu ; au dessous, elles s'atténuent peu à peu jusqu'à la base légèrement élargie et amplexicaule.

Paniculiforme, haute de 8 à 15 cm. et large de 4 à 8 cm., l'inflorescence, qui termine la tige, se compose de six à dix pédoncules primaires latéraux alternes terminés par des cymes irrégulières et corymbiformes.

Hauts de 4·50 à 11·50 mm., nettement renflés dans leur partie supérieure, les pédicelles supportent des fleurs érigées.

Le calice se compose d'un tube haut de 0·60 à 1·25 mm. et de cinq segments non prolongés en éperon au dessous de leur insertion, un peu plus longs que le tube, un peu plus hauts que larges, longs de 1·20 à 2 mm. et larges de 1 à 1·50 mm. ; ces segments, qui sont deltoïdes et ont des bords entiers, s'élargissent peu à peu depuis le sommet aigu jusqu'à la base qui est, elle même, légèrement dilatée.

Plus longue que le calice, la corolle se compose d'un tube haut de 0·20 à 0·50 mm. et de cinq segments ovés, beaucoup plus longs que le tube, plus hauts que larges, longs de 4·25 à 5·75 mm. et larges de 1·60 à 2·25 mm. Pourvus sur leur face externe d'une très légère carène qui suit leur nervure médiane, ces segments, dont les bords sont entiers, ont leur plus grande largeur un peu au dessous du milieu ; au dessous de ce niveau ils se rétrécissent jusqu'à la base qui n'est, elle même, ni élargie, ni rétrécie ; au dessus, ils s'atténuent jusqu'au sommet aigu que dépasse légèrement l'extrémité supérieure de la carène pétalaire qui se prolonge en un bref mucron.

L'androcée se compose de dix étamines glabres, à filets très longuement et très étroitement deltoïdes-linéaires ; les filets oppositipétales, dont le sommet atteint presque l'extrémité supérieure de la corolle, sont insérés à une faible distance de la base de cette dernière ; leur partie soudée est haute de 0·50 à 1 mm. ; leur partie libre, longue de 3·10 à 5·10 mm., est large de 0·17 à 0·25 mm. à la base et de 0·40 à 0·50 mm. au milieu. Les filets alternipétales sont soudés à la corolle sur une longueur égale à celle du tube de cette dernière, c'est à dire, sur une longueur variant de 0·20 à 0·50 mm. ; leur partie libre, haute de 3·50 à 5 mm., est large de 0·40 à 0·50 mm. à la base et de 0·17 à 0·25 mm. au milieu. Subovées-réniformes, un peu plus hautes que larges ou aussi hautes que larges, émarginées à la base et très obtuses au sommet, les anthères sont longues de 0·60 à 0·65 mm. et larges de 0·55 à 0·60 mm.

Nettement contractés à la base en une petite colonne qui est formée par la réunion de la partie soudée des cinq carpelles et qui donne au gynécée une apparence stipitée, les carpelles s'atténuent, dans leur partie supérieure, en styles grêles, plus brefs qu'eux et terminés au sommet par des stigmates légèrement dilatés ; leur partie soudée est haute de 0·50 à 0·60 mm. ; leur partie libre, de 2·50 à 4 mm. ; les styles sont longs de 0·75 à 1·25 mm. Dans chaque carpelle, les placentes, qui portent des ovules sur toute leur longueur, sont constitués par deux grêles cordons qui courent tout le long des faces internes des carpelles et parallèlement à leur bords internes.

Obovées-subtrapéziformes, un peu plus hautes que larges, aussi hautes que larges ou même un peu plus larges que hautes, longues de 0·50 mm. et larges de 0·40 à 0·60 mm., les écailles, qui ont leur plus grand diamètre au sommet largement émarginé, s'atténuent peu à peu jusqu'à la base très légèrement élargie.

Les follicules, au nombre de cinq, sont appliqués les uns contre les autres et ont des faces internes non gibbeuses.

Obovées-oblongues, plus hautes que larges, longues de 0·80 mm. et larges de 0·25 mm., les graînes, dont le nombre varie de 36 à 40 dans chaque follicule, sont constitués par une amande oblongue haute de 0·40 mm. incluse dans un test lâche et transparent qui la déborde un peu sur les faces latérales et assez longuement à ses extrémités latérales.

Cette espèce, qui rappellera à mon camarade Bonnafous nos quelques moi de bonne vie commune, est originaire de Chine où elle a été récolté par le Dr. A. Henry dans le district de Patung (n° 3708) et à Changyang, dans la province de Hupeh (n° 7718). Elle a été recueillie aussi par E. H. Wilson dans le sud du Wushan (n° 2729). Ces échantillons sont tous conservés dans l'herbier des Royal Botanic Gardens de Kew.

Le *S. Bonnafousi* appartient à la Section *Celephium* Koch, mais s'écarte nettement de toutes les espèces de ce groupe par son port caractéristique.

FLORA OF SEYCHELLES AND ALDABRA:

New Phanerogamia, chiefly of the Percy Sladen Trust Expedition, with some Emendations in Synonymy.

By W. BOTTING HEMSLEY, LL.D., F.R.S.

Fifteen years have elapsed since I began studying the flora of Seychelles in my official capacity at Kew, and since 1901 various collections, small and large, have been received at Kew for classification and publication. All of the collectors have been more or less associated in the botanical exploration of those islands; therefore a few words of explanation seem desirable to make matters clear. In 1901 the late Dr. A. F. W. Schimper, Botanist of the German Deep Sea Expedition (1898–1899), sent to Kew dried specimens of about a score of Seychelles plants, prepared by the Hon. H. P. Thomasset, a proprietor in Mahé, with the request that they should be named, and any new species described for publication in the Reports on the Expedition. The Director of Kew placed this collection in my hands for determination and report. This report was written and sent to Dr. Anheisser in 1902, and, so far as I am aware, the enumeration and descriptions have not been published by the German authorities. The report contained one or two descriptions and some emendations of synonymy. In the meantime Dr. Schimper had died, and the correspondence was continued by Dr. H. Schenck and Dr. R. Anheisser. Subsequently Kew entered into direct correspondence with the Hon. H. P. Thomasset, who presented the Herbarium from time to time with excellent specimens of between two and three hundred species of Seychelles flowering plants and ferns, a number of which were new to science and have been published in Hooker's *Icones Plantarum* and the *Kew Bulletin*. Subsequently the much more extensive collections made by the Percy Sladen Expedition in 1905, and further collections made by Prof. J. Stanley Gardiner and Mr. J. C. F. Fryer, of the Board of Agriculture and Fisheries, were received at Kew. Mr. P. R. Dupont, the Curator of the Botanic Station at Mahé, has also been a considerable contributor. All the specimens thus received were consolidated, and I began studying the collection during my last years at Kew, with the intention of drawing up in my retirement an enumeration of all the vascular plants known from the islands. Various untoward events have prevented me from carrying out this plan. Now it has been decided, with the permission of Prof. J. Stanley Gardiner and the Director of Kew, to publish the novelties and emendations in synonymy, in anticipation of the complete list of the species and of the report on the general geography of the constituents of the flora under preparation on behalf of the Percy Sladen Trustees. It should be explained that additional materials have enabled the writer to make some emendations in Mr. J. G. Baker's determinations, chiefly published in the *Flora of Mauritius* (1877). At the same time he is fully aware that a more critical study of the French collections from the region would probably lead to the reduction of a number of his proposed new species, especially those from Aldabra.

CAPPARIDACEÆ.

Mærua Dupontii Hemsl., sp. n.; inter species Africanas foliis compositis et floribus petaliferis differt.

Frutex præter inflorescentiam glabrescens, ramis teretibus creberrime albo-verruculosis. Folia sæpius palmatim trifoliolata, interdum quadrifoliolata, stipulata, petiolata; stipulæ minutæ, acutæ, cito deciduæ; petiolus gracilis, 1–5 cm. longus; foliola papyracea vel fere membranacea, brevissime petiolulata, inæqualia, forma variabilia, lanceolata, oblonga, ovata, elliptica vel interdum fere orbicularia, 2-8 cm. longa, apice obtusa vel rotundata, simul apiculata, basi rotundata vel subcuneata. Flores parvi, 10-20 in racemos terminales quam folia vix longiores dispositi; bracteæ lineares vel filiformes, circiter 5 mm. longæ; pedicelli graciles, puberuli, 1–1·5 cm. longi. Calyx primum rufo-puberulus; tubus brevissimus, inflatus, persistens; limbi lobi 4, valvati, obovato-spathulati, 7–8 mm. longi, 3-nervii, apice dorso breviter cornuti, margine ciliolati. Petala 4, obovata, circiter 4 mm. longa, breviter unguiculata, venosa. Discus obscurus. Stamina circiter 12–16, 1·5–2 cm. longa, filamentis filiformibus basi connatis. Gynophorum cum ovario stamina paulo excedens. Ovarium pluriovulatum. Fructus cylindricus, torulosus (maturus non visus), paucispermus.

ALDABRA: Fryer, 64; Dupont, 136, 137.

BIXACEÆ.

Aphloia seychellensis Hemsl., sp. n.; inter species affines floribus minoribus et sepalis tenuibus distincta.

Frutex glaber, ramis florigeris graciliusculis. Folia spiraliter posita, distincte petiolata, oblongo-lanceolata vel interdum ovata, 3–10 cm. longa, sed sæpius tantum 6–8 cm. longa, obtusa, crenulata. Flores in axillis foliorum solitarii vel sæpius 2–5, fasciculati, 6–7 mm. diametro; pedicelli filiformes vel fere capillares, basi sursumque bracteolati, bracteolis minimis squamiformibus. Sepala tenuia, haud coriacea, suborbicularia, maxima circiter 3 mm. lata. Stamina sepala paullo superantia.—*A. mauritiana* Baker, Flora, 12, pro parte. *A. madagascariensis* var. *seychellensis*, Clos in Ann. Sc. Nat. sér. 4, viii, 274.

MAHÉ: Thomasset, 25, 172; Dupont, 44; Gardiner. SIL-

HOUETTE: Gardiner. PRASLIN: Horne, 305. Common in Mahé and Praslin. In the latter island it forms no inconsiderable portion of the exogenous vegetation.—Horne. Endemic, as here limited.

I have ventured to raise the forms included by Baker under his *A. mauritiana* to specific rank, though not without some misgivings regarding the names adopted. I am unable to fix the type of *Lightfootia theæformis* Vahl (*Symbolæ* iii, 69 (1794), based on a Bourbon specimen, and on this depends the final and correct nomenclature in the genus. However, I have introduced no new names. Cordemoy (Fl. Réunion, 375) recognises only one species in Bourbon—*A. theæformis* Benn. Warburg (Engler & Prantl, Natürl. Pflanzenf. iii, 6, A. 42) revives *Neumannia* (A. Rich. in La Sagra, Hist. Fis. Cuba i, (1845) 96) for *Aphloia*, thus adding a further complication to the synonymy.*

PITTOSPORACEÆ.

Pittosporum Wrightii Hemsl., sp. n.; species *P. Senaciæ* Putterl. arcte affinis, differt foliis sæpius majoribus abrupte, obtuseque acuminatis floribus majoribus et sepalis late ovatis.

Frutex omnino glaber, ramis florigeris graciliusculis, cortice albo. Folia coriacea, petiolata, forma variabilia sed sæpius obovata, nunc lanceolata nunc fere elliptica, cum petiolo 8–15 cm. longa, obtuse acuminata, interdum rotundata, basi cuneata, marginata, venis immersis inconspicuis. Flores subumbellatim corymbosi; corymbi terminales, quam folia multo breviores, 3–5 cm. diametro, ebracteati, bracteolis minimis cito deciduis, ramulis pedicellisque gracilibus. Sepala anguste ovato-oblonga, 2–2·5 mm. longa, utrinque rotundata, decidua. Petala spathulata, vix 1 cm. longa, apice rotundata, obscure venosa. Stamina petalis paullo breviora, filamentis crassis carnosis. Ovarium glabrum; stylus sursum attenuatus, stamina haud æquans. Capsula bivalvis, valvis

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*APHLOIA INTEGRIFOLIA Benn.; species foliis spiraliter positis distincte petiolatis basi cuneatis obscure crenulatis, floribus fasciculatis rarissime solitariis 1·5–1·7 cm. diametro, sepalis valde coriaceis inæqualibus latioribus quam longis maximis 1 cm. latis minimis 4–5 mm. latis, staminibus pernumerosis, stigmate circiter 5 mm. diametro.—*A mauritiana* var. *integrifolia* Baker, Flora, 12; *Prockia integrifolia* Willd.

Only known from Mauritius; collected by Bouton.

Aphloia sessilifolia Hemsl., sp. n.; species distinctissima ramis florigeris crassis, internodiis brevissimis, foliis crassis distichis imbricatis sessilibus semiamplexicaulibus oblongo-ellipticis apice rotundatis basi cordatis calloso- vel glanduloso-crenulatis, floribus in foliorum axillis solitariis saltem 1 cm. diametro.—*A. mauritiana* var. *sessilifolia* Baker, *l. c.*

Apparently confined to Mauritius; collected by G. Gardner and J. Horne: the latter notes: "The habit is much the same as that of *A. theæformis*, but otherwise this is a distinct form."

suborbicularibus circiter 1 cm. diametro verruculosis. Semina subtrigona, nitida, brunneo-purpurea. *P. Senacia* Baker, Flora, 13, vix Putterl.

MAHÉ: In the mountains, Thomasset, 86; Morne Blanc at 600 metres, Gardiner. SILHOUETTE: Mare aux Cochons, Gardiner, xlii.

Although the Seychelles specimens are easily distinguished from the Mauritius specimens, referred to *P. Senacia* Putterl., it is not so easy to point out definitive specific differences. Apart from the larger leaves and larger flowers of *P. Wrightii*, there are slight differences in the floral structure which may or may not be constant.

TERNSTROEMIACEÆ.

MEDUSAGYNE OPPOSITIFOLIA Baker, Flora, 17; D. Oliv. in Hook. Ic. Pl. 1252; Hemsl. *op. cit.* t. 2790.

MAHÉ: Summit of Sebert, Thomasset, 226; Cascade Estate, Thomasset, 182.

Since my description of this shrub appeared in the Icones, perfect seeds have been received, and I am able to add: albumen parcissimum; embryo clavatus, circiter 2 mm. longus, radicula superiore cotyledones ovatas fere æquante.

MALVACEÆ.

ABUTILON species, an *A.* "*angulosum*" Bojer, in Herb. Kew? Frutex novellis fere undique pubescentia albida brevissima obscure vestitis, ramis florigeris plus minusve angularibus. Folia longe petiolata, papyracea, quam internodia sæpius longiora; lamina orbiculari-cordata, 5–10 cm. longa, obtuse acuminata, simul apiculata, lobis basalibus rotundatis, sinu aperto, edentata; venæ primariæ sæpius 7 vel 9, e basi radiatæ, sat conspicuæ; petiolus sæpius 4–5, interdum usque ad 10 cm. longus, gracilis, apice plus minusve villoso-barbatus. Flores flavi, 4–5 cm. diametro, in axillis foliorum solitarii vel interdum subracemosi, pedicellati, pedicellis gracilibus petiolos æquantibus vel longioribus. Calyx 11–13 mm. longus, crassus, fere coriaceus, albidus, extus dense stellato-tomentosus, intus densissime appresso-setulosus, setis demum auctis; lobi ovato-acuminati, apice marginibus involuti, infra medium inflati, dorso carinati. Petala sursum latiora, oblique rotundata, bifida, columnam genitaliam paullo excedens. Columna staminifera extus parce stellato-pubescens. Ovarium circiter 25-loculare, dense stellato-villosum, stylis glabris stamina paullo superantibus. Carpella (perfecta non visa) villosa, oblongo-elliptica, circiter 1 cm. longa, utrinque rotundata, erostrata.—*A. indicum* Baker in Kew Bull. 1894, 147, non. L.

ALDABRA: Abbott; Dupont, 58; Thomasset, 226. Thomasset's specimens are labelled Astove, Cosmoledo, and Aldabra. I have not ventured to deal with this species in a positive sense.

HIBISCUS PHYSALOIDES Guill. et Perr. Fl. Seneg. p. 52: Masters in Fl. Trop. Afr. i. 199. *H. Hornei* Baker, Flora, 23.

PRASLIN: Growing among maize, Horne, 356, 429.

TILIACEÆ.

TRIUMFETTA SUBPALMATA Soland.; Hemsl. in Journ. Bot. xxviii, 2, t. 293 (1890). *T. procumbens* Baker, Flora 32, et auct plur., non Forst.

MAHÉ: Anse la Gui, rare, Horne, 419. Cochin China, Java, Borneo, Keeling Islands, and Northumberland, Howick, and other islands off Queensland. Until 1890 this species had been confused with the commoner *T. procumbens*.

ERYTHROXYLACEÆ.

ERYTHROXYLON SECHELLARUM O. E. Schulz in Engler, Pflanzenreich, iv, 134, 158; *E. laurifolium* Baker, Flora, 35, pro parte, non Lam.

MAHÉ: Common in mountains, Thomasset, 88; Gardiner.

SILHOUETTE: Glacis over Mare aux Cochons, Gardiner, xxiv.

Erythroxylon acranthum Hemsl., sp. n.; species ex affinitate *E. platycladi* Bojer, a qua differt fasciculis paucifloris, petalis undulatis, foliis floribusque in ramorum apicibus confertis.

Frutex omnino glaber, ramulis floriferis brevibus, cortice insigniter rugoso. Folia pauca, ad apices ramorum conferta, alterna, petiolata, vix coriacea, obovata vel interdum oblonga, 2–6 cm. longa, apice rotundata, interdum emarginata, basi cuneata, margine leviter incrassata; costa infra elevata; venæ immersæ, obscuræ; petiolus 3–5 mm. longus. Flores circiter 5-7 in axillis foliorum supremorum fasciculati, 6–7 mm. diametro, glabri; bracteæ parvæ, ovatæ, cito deciduæ; pedicelli graciles, 4–8 mm. longi. Sepala 5, basi connata, ovata, circiter 2 mm. longa, apiculata. Petala totidem, oblongo-navicularia vel cochlearia, 4–5 mm. longa, intus infra medium cristata, apice rotundata Stamina 10, petala paullo superantia, filamentis basi connatis incrassatis, glandulis parvis squamiformibus alternantibus. Styli 3, stamina excedentia, stigmatibus capitatis. Fructus non visus.

ALDABRA: Dupont, 103; Thomasset, 233; Fryer, 35, 87.

BALSAMINACEÆ (by J. D. Hooker).*

Impatiens Thomassetii Hook. f., sp. n.; herba alternifolia, grandiflora, foliis ovalis spinuloso-serratis, inflorescentia pedunculata, labelli calcare, 7 cm. longo.

Herba? verosimiliter elata, glaberrima, grandiflora, caule sat robusto folioso. Folia 8–15 cm. longa, alterna, longe petiolata, exsiccata membranacea, ovata vel ovato-lanceolata, acuminata, spinuloso-serrulata, basi in petiolum 3–7 cm. longum angustata, utrinque 8–10-nervia, costa subtus valida, nervis gracilibus; glandulæ infra petiolares nullæ. Inflorescentia pedunculata; pedunculi axillis supremis enati, erecti, 2–4-flori, foliis multo breviores; pedicelli florentes 4–5 cm. longi, fructiferi paullo longiores; bracteæ ovato-lanceolatæ, 3–5 mm. longæ, deciduæ.

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* Sir Joseph Hooker's manuscript was received July 19th, 1910.

Flores ampli, ad 5 cm. expansi, albi; raphides nullæ. Sepala 2, ovato-lanceolata, acuminata, 5–7-nervia, viridia. Vexillum amplum, orbiculare v. late obovatum, 2–2·5 cm. diametro, apice emarginatum v. bilobum, costa dorso carinata, carina mutica viridi. Alæ latæ, sessiles, ad 3 mm. longæ et latæ; lobus basalis late obovatus v. obcordatus, 2–5 cm. longus distalis paullo minor, obovato-oblongus, apice rotundatus; auricula dorsalis nulla. Labelli limbus scaphiformis, ovatus, acuminatus, 1·5–1·7 mm. longus, reflexus; calcar gracile, 6–7 cm. longum, rectum, pendulum. Filamenta brevissima, late linearia; antheræ minimæ, in capitulum decurvum connatæ, polline purpureo. Ovarium fusiforme, rectum. Capsula anguste ellipsoidea, utrinque attenuata, recta, acuminata, 2–5 cm. longa, polysperma. Semina minima, pyriformia, compressa, 2 mm. longa, lævia, glabra.

Mahé: Morne Blanc, Thomasset, 205.

The above description is drawn up from a single specimen and an excellent drawing by Mr. Thomasset of leaf and flower. The specimen may be either the summit of a simple stem or a branch. It is 11 cm. long, and bears ten spreading leaves, several large flowers, and a fully formed capsule.

Impatiens Gordonii Horne ex Baker, Flora, 38; herba succulenta, glaberrima, longe petiolata et pedunculata, foliis alternis, floribus amplis longe calcaratis.

Herba annua v. biennis, 3–4 ped alta, glaberrima, succulenta, grandiflora, caule ramoso. Folia apices versus ramorum conferta, 6–10 cm. longa, alterna, exsiccata firma ovato-lanceolata vel oblonga, spinuloso-crenato-serrata, basi in petiolum gracilem 3–12 cm. longum angustata, nervis utrinque 6–7 gracillimis; glandulæ infrapetiolares nullæ. Inflorescentia pedunculata; pedunculi petiolis subæquilongi, graciles, 3–6-flori; pedicelli 2–5 cm. longi; bracteæ lanceolatæ, 3–5 mm. longæ. Flores 4–5 cm. expansi, albi, petalis basi roseis. Sepala 2, ovata, acuminata, 4–5-nervia, viridia. Vexillum amplum, orbiculare, 2–2·5 cm. latum, dorso medio carinatum, muticum. Alæ sessiles, 2·5 cm. longæ; lobus basalis rotundatus, distalis duplo major, oblongus; auricula dorsalis?. Labelli limbus parvus, scaphiformis, orbicularis, 8 mm. diametro; calcar 5–7 cm. longum, gracile, pendulum. Filamenta brevia, lata; antheræ majusculæ, decurvæ. Ovarium fusiforme, obtusum. Capsulæ anguste ellipsoideæ, utrinque attenuatæ, 2–2·5 cm. longæ, rectæ v. lente curvæ, teretes, glandulosæ polyspermæ. Semina obovoidea, ad 2 mm. longa, glabra.

Mahé and Silhouette: Margins of woods, Horne, 439, 1874; Cascade Estate, Thomasset, 5.

Impatiens Balsamina L.; forma 4–5 dm. alta, caule stricto simplice v. ramoso-folioso, foliis 8–10 cm. longis, lanceolatis, serratis, floribus ad 2·5 cm. expansis, sepalis petalisque textura permolli, calcare labelli limbo duplo longiore, capsulis 2·5 cm. longis acutis.

Mahé: Morne Blanc, Thomasset.

The habit, foliage, and flowers of the specimen is that of var.

longifolia (*I. longifolia* Wright & Arn. Prodr., 136), which is sporadic all over India from the Himalayas to Travancore, Burma, the Malayan Islands and China, from which it appears to differ in the soft friable texture of the sepals in a dried state which rendered their analysis when moistened very troublesome. This is a character which I have not met with in any other of the numerous form of *I. Balsamina* which I have examined. Var. *longifolia* is not, to my knowledge, a garden plant anywhere.

OCHNACEÆ.

Ochna Fryeri Hemsl., sp. n.; species ab *O. mauritiani* recedit foliis majoribus, floribus majoribus, filamentis ratione dimidio brevioribus, ovario 10-loculare et stylis fere ad apicem coalitis.

Arbor parva (Dupont) undique glabra, ramulis floriferis rigidis, per anthesin aphyllis, cortice ruguso cinereo. Folia pauca, ad apices ramulorum conferta, decidua, alterna, exstipulata, breviter petiolata, tenuia, oblongo-lanceolata, 6–12 cm. longa, apice rotundata, simul apiculata, basi subcuneata, nitida, margine obscure crenulata, crenulis apiculato-glandulosis; venæ ultimæ tenuissimæ, creberrime reticulatæ; petiolus 4–5 mm. longus. Flores lutei, pentameri, circiter 1·5 cm. diametro, in apicibus ramulorum brevium lateralium et terminalium dense corymbosi, corymbis multifloris 4–6 cm. diametro. Perulæ concavæ, cito deciduæ. Bracteæ coloratæ, parvæ, angustæ, tenuissimæ, etiam cito deciduæ. Pedicelli graciles, sæpius 2–2·5 cm. longi, infra medium articulati. Sepala colorata, persistentia, fructifera leviter aucta, indurata, orbiculari-elliptica, concava, inæqualia, maxima 1 cm. lata. Petala orbicularia, 7–10 mm. lata, distincte unguiculata. Stamina circiter 40; filamenta primum 2–2·5 mm., persistentia et demum usque ad 4–5 mm. longa, rigida; antheræ basifixæ, 3–4 mm. longæ, cito deciduæ. Ovarium sæpius 10-lobum; styli stamina superantes, ad apicem connati. Drupæ compresso-ellipsoideæ, bene evolutæ non visæ.—*O. ciliata* Baker in Kew Bull., 1894, 147, vix Lam.

ALDABRA: Abbott; Dupont, 1; Fryer, 32.

O. Fryeri differs from *O. ciliata* Lam. as represented in the Kew Herbarium by a specimen collected by Boivin in Madagascar, by its much larger leaves and more copious inflorescence. The Madagascar plant has narrow oblong-lanceolate leaves from 4–8 cm. long, with very obscure marginal bristles.

MELIACEÆ.

CARAPA OBOVATA Bl. *C. moluccensis* Baker, Flora, 46, in nota, non Lam.

PRASLIN: St. Anne's Bay, Horne, 441.

CARAPA MOLUCCENSIS Lam. *Trichilia*? Baker, Flora, 47.

MAHÉ: On the borders of a swamp near the sea, north of Port Victoria, Horne, 405.

ICACINACEÆ.

GRISOLLEA THOMASSETII Hemsl. in Hook. Ic. Pl. xxviii, t. 2784 (1905).

MAHÉ: Not uncommon in the forest of the Cascade Estate, Thomasett, 54; various other localities, Gardiner. SILHOUETTE: Jungle above Mare aux Cochons, at 2000 ft., Gardiner.

This is the plant collected by Horne and E. P. Wright referred to by Baker (Flora, p. 48), under *Apodytes*.

APODYTES MAURITIANA Planch; Baker Flora, 48. Descriptio hic amplificata.

Arbor 9–12 m. alta, ramis floriferis crassiusculis rugosis, novellis leviter puberulis. Folia ad ramorum apices conferta, alterna, petiolata, exstipulata, glabra vel citissimo glabrescentia, parum coriacea, in siccis nigrescentia; lamina lanceolato-oblonga, interdum fere elliptica, 4–8 cm. longa, apice obtusissima vel rotundata, basi subcuneata, integerrima, supra nitida, subtus opaca; costa angusta; venæ immersæ, obscuræ; petiolus gracilis, circiter 1 cm. longus. Flores parvi, albi, odorati, in cymas paniculatas denses puberulas terminales quam folia sæpius breviores dispositi, nunc sessiles nunc brevissime pedicellati, ebracteolati vel bracteolis minimis. Calyx puberulus, cupularis, circiter 0·5 mm. altus, obscure 5-dentatus, dentibus obtusis. Petala 5, valvata, ligulata, 3–4 mm. longa, apice inflexa. Stamina 5, petalis alterna; filamenta filiformia, nuda, quam petala paulo breviora; antheræ lineares, versatiles, basi bifidæ. Discus minimus vel obsoletus. Gynæceum glabrum, leviter obliquum. Ovarium uniloculare, biovulatum, ovulis pendulis superpositis; stylus stamina vix æquans. Fructus drupaceus, immaturus tantum visus, oblique ellipsoideus, circiter 1 cm. diametro, compressus, intus extusque obscure costatus, extus puberulus, basi appendice ventrali parva hemisphærica carnosa inter stylum persistentem lateralem instructus. Semen unicum tantum sæpius evolutum, fere planum; embryo minutus.

ALDABRA: Thomasset, 225; Fryer, 62.

CELASTRACEÆ.

CELASTRUS SENEGALENSIS Lam., sensu D. Oliver Fl. Trop. Africa, i, 361.

The Aldabra specimens are easily sorted into three forms, or varieties, or whatever status may ultimately be ascribed to them.

Forma 1. Frutex spinis validis armatus. Rami albidi, rigidissimi, internodiis brevissimis. Folia brevissime petiolata, coriacea, obovato-oblonga vel interdum fere spathulata, plerumque 3–5 cm. longa, obscure calloso-denticulata; venæ in siccis præcipue subtus sat conspicuæ. Cymæ parvæ, multifloræ, breviter pedunculatæ vel sessiles. Capsulæ subglobosæ, 4–5 mm. diametro, nudæ, bivalvæ, valvis demum divergentes.

ALDABRA: Dupont, 41; Fryer, 57; Thomasset, 256.

Dupont gives this the name of Bambara Chapelet. "Bambara," according to Baker, is a name applied in Mauritius to *Toddalia aculeata*, *Scutia Commersonii*, and *Pisonia aculeata*—all shrubs armed with spines. This form is nearest typical *C. senegalensis* Lam.

Forma 2. Frutex inermis, ramis graciliusculis flexilibus. Folia ambitu variabilia sed sæpius elliptica vel orbicularia et 4–6 cm. diametro, crenulata. Cymæ minimæ, pauciflοræ. Flores minimi.

ALDABRA: Dupont, 19, 19 bis, 95, 101; Fryer, 11; Thomasset, 234, 245, 246.

Judging from the numerous specimens this must be one of the commonest shrubs in Aldabra. Dupont names it *Bois la Fumée.*

Forma 3. Frutex inermis, ramis rectis elongatis. Folia breviter petiolata, tenuiter coriacea, ovata vel interdum fere orbicularia 6–8 cm. longa, circiter 5 cm. lata. Flores in axillis foliorum solitarii vel cymosi, cymis 3–5-floris.

ALDABRA: Dupont, 49.

This is perhaps nothing more than a luxuriant specimen of no. 2. Dupont gives it the same popular name *Bois la Fumée. Gymnosporia senegalensis*, var. *inermis*, forma *β. chartacea* Loesener, in Bull. Herb. Boiss., iv, 430, sine descriptione, may belong to this form. It was collected in Aldabra by A. Voeltzkow.

I have referred the specimens of *Celastrus* cited above to *C. senegalensis*, as understood and defined by Prof. D. Oliver, not because I feel quite convinced that they all belong to *C. senegalensis* Lam., but because any other, possibly more satisfactory, classification would involve the critical examination of an enormous quantity of material from the most widely distant districts of tropical Africa, to say nothing of the Mediterranean region and extra-tropical South Africa.

HIPPOCRATEACEÆ.

HIPPOCRATEA, species nova?

Frutex ope ramulorum lateralium aphyllorum scandens, omnino glaber. Rami florigeri rigidi, creberrime lenticellati, internodiis quam foliis brevioribus. Folia opposita, breviter petiolata, coriacea, obcordata, obovata, vel nonnunquam elliptica, cum petiolo 3–5 cm. longa, 2–3·5 cm. lata, venosa, supra nitida, marginata. Flores ignoti; alabastra minuta tantum visa.

ST. PIERRE: Bushy climber not found elsewhere. Dupont, 4.

RHAMNACEÆ.

Smythea Dupontii, Hemsl., sp. n.; species ex affinitate *S. calpicarpæ* Kurz, a qua differt foliis lanceolatis paucinerviis et fructu acuminato.

Frutex scandens vel vagans, ramis florigeris gracilibus flexuosis primum parce puberulis; internodia quam folia multo breviora. Folia brevissime petiolata, coriacea, lanceolata, 4–10 cm. longa, obtusa, simul apiculata, basi cuneata, margine obscure longeque calloso-denticulata, utrinque glaberrima, supra nitida; venæ primariæ utrinque 3 vel 4, curvatæ, secundariæ transversæ ultimæ minute reticulantibus. Flores parvi, 2–3 mm. diametro,

pubescentes, in axillis foliorum fasciculati, numerosi, brevissime pedicellati. Calycis dentes deltoidei, circiter 1·5 mm. longi, subacuti, persistentes. Petala breviter ungiculata. Fructus immaturus tantum visus, lanceolatus, 2–3 cm. longus, acuminatus.

PRASLIN: Grand' Anse, Dupont, 17.

This may prove to be the same as *Ventilago lanceata* Tulasne in Ann. Sc. Nat. sér. 4, viii, 121 (1857), where that author has a long discussion on the affinities of *Ventilago*. He adds: "Viget ad littora Oceani in insula Mahé Sechellarum. Pervillei, herb. 126."

GOUANIA RETINARIA DC. Prodr. ii, 40; Balf. fil., in Proc. Roy. Soc. clxviii, 1879, Reprint, p. 34. *G. tiliæfolia* Baker, Flora, 52, pro parte.

ALDABRA: Dupont, 2, 129; Fryer, 76; Thomasset, 231.

I accept Balfour's identification of this species, which has distinctly winged fruits, dehiscing early.

GOUANIA TILIÆFOLIA Lam.; Baker, Flora, 52, pro parte; Schinz in Abhand. Senckenb. Naturfor. Gesellsch. xxi, 86.

ALDABRA: Abbott.

There is some doubt about this being the *G. tiliæfolia* of Lamarck, and Voeltzkow's specimen referred to this species may be the much commoner *G. Retinaria*. Abbott's specimen in the Kew Herbarium was inadvertently labelled by Baker *Colubrina asiatica*, and Schinz includes it under that name in his Enumeration, on Baker's authority. *G. tiliæfolia* has a woody, wingless fruit, tardily dehiscent.

SAPINDACEÆ.

MACPHERSONIA MADAGASCARIENSIS Blume, *Rumphia*, iii, 156; Radlk. in Sitzungsb. K. Baier. Akad., 1890, 248; *M. pteridophylla* Baill., *Adansonia*, xi, 240; *Albizzia fastigiata* Mey. ? Baker in Kew Bull., 1894, 148—leaves only.

ALDABRA: Abbott; Dupont, 28.

There are three very closely allied species of *Macphersonia*, namely, the above and *M. lævis* and *M. Hildebrandtii* Radlk., *l. c.* and I am not quite sure that I am right in referring the Aldabra specimens to *M. madagascariensis*.

Dupont (Report), p. 36, tabulates "*Albizzia fastigiata* E. Meyer" from Cosmoledo, Assomption, and Aldabra. The label accompanying his specimens, numbered 28 (*Macphersonia*), runs:—"Aldabra and Cosmoledo only. Very rare; found six specimens at Takamaka, near Point Hodoul, Aldabra." He also states that it is a small tree and names it "Tamarind Batard." In his Report he gives "Tamarind Marron" as the popular name of "*Albizzia fastigiata*," which signifies much the same thing. D. Oliver is the authority for the combination *Albizzia fastigiata*, the *Zygia fastigiata* of E. Meyer.

LEGUMINOSÆ-PAPILIONACEÆ.

DESMODIUM DIVERSIFOLIUM DC. Prodr. ii, p. 334?; foliis dimorphis, nunc (sæpius) trifoliolatis, (foliolo terminali majore) nunc unifoliolatis intermixtis, foliolis orbicularibus vel ovalibus basi rotundatis vel leviter cordatis 1–3 cm. latis. Flores absunt.

MAHÉ: Only one plant found, Horne, 287.

This is the plant mentioned by Baker (Flora, p. 75) as most likely *D. ascendens* Sw. (Oliver, Fl. trop. Afr. ii, p. 162), but it is quite different in foliage from *D. ascendens*. Balfour (Bot. Rodriguez, p. 36) collected exactly the same thing in the same condition in Rodriguez. De Candolle describes the leaves of his plant, a native of Madagascar, in the following words: "foliis aliis unifoliolatis aliis trifoliolatis, foliolis ovalibus supra glabris subtus in nervis puberulis, terminali duplo triplove majore." These words so well describe the leaves of the plant from Seychelles and Rodriguez that I have little doubt respecting the correctness of my identification. The only discrepancy is in the relative size of the lateral and terminal leaflets; the terminal one never being even quite twice the size of the lateral, in the specimens cited.

DESMODIUM HETEROPHYLLUM DC. Prodr. ii, 334, *D. triflorum* var. *heterophyllum* Baker, Flora, 75; Hook. Fl. Brit. Ind. ii, 173.

SEYCHELLES: Bojer.

Baker records this from Seychelles as well as from Mauritius; but I have not seen the specimens. It is common in the Western Peninsula of India and occurs in Ceylon, and Thwaites (Enum. Pl. Zeyl. 86) gives it specific rank, which seems fully justifiable, as it is easily distinguished from *D. triflorum*.

ABRUS PRECATORIUS L.; Baker, Flora, 78; Balfour, Bot. Rodriguez, 36; Hemsl., Bot. Voy. Chall. i, pt. 3, 140; Cordemoy, Fl. Réunion, 389. *A. pulchellus* Baker, Flora, 79, non Wall.

MAHÉ: Victoria Region, Gardiner. SILHOUETTE: Mare aux Cochons, Gardiner, 139.

The leafless specimen collected by Horne and referred by Baker to *A. pulchellus* is *A. precatorius*, if the character of fewer seeds holds good. Several young pods examined contained only five seeds each.

Tephrosia aldabrensis J. R. Drumm. et Hemsl., sp. n.; species inter minores, 15–35 cm. alta, densissime ramosa, ramis fere filiformibus.

Herba nana, pubescens, glabrescens, ramis tenuissimis flexuosis. Folia sæpissime 7- vel 9-foliolata, 3–5 cm. longa, breviter graciliterque petiolata; foliola brevissime petiolulata, oblongo-lanceolata, 0·5–1·5 cm. longa, apiculata; stipulæ minutæ, cito deciduæ. Racemi breves, sæpe 6-flori, folia breviter excedentes. Flores distincte pedicellati, circiter 1 cm. longi. Calyx strigillosus; tubus hemisphæricus; lobi fere æquales, subulati, quam tubum vix longiores. Petala puberula, fere æquilonga, longuiscule unguiculata; vexillum rotundatum, latius quam longum. Ovarium parce pilosulum, stylo complanato, apice cristato. Legumen rectum, 2–3 cm. longum, glabrescens, sæpius 10-spermum. Semina subglobosa, circiter 2 mm. diametro, rugulosa, nigro-punctata.—*T. purpurea*, Baker in Kew Bull., 1894, 147, non Pers.

ALDABRA: Abbott; Dupont; Thomasset, 230; Fryer, 59.

TEPHROSIA PURPUREA Pers.; Baker, Flora, 71, pro parte. Balfour, Bot. Rodriguez, 36. Cordemoy, Fl. Réunion, 398.
SEYCHELLES: Without locality, Pervillé; J. Horne, 480.
Common in all the islands.—Horne.

Tephrosia subamœna J. R. Drumm. et Hemsl., sp. n.; *T. purpureæ* similis, differt habitu robustior, legumine dense sericeo-hirsuto ferrugineo.

Herba erecta, circiter metralis, ramosa, plus minusve appresso-hirsuta. Folia breviter petiolata, multijuga, usque ad 10–12 cm. longa; foliola brevissime petiolulata, anguste obovato-oblonga, 2–4 cm. longa, apicula, basi cuneata; stipulæ lineari-filiformes, 5–7 mm. longæ. Racemi terminales, simplices, laxi, 10–15 cm. longi, bracteis minutis cito deciduis. Flores brevissime pedicellati, circiter 1 cm. longi, extus pilis rectis appressis densissime vestiti. Calycis lati lobi inæquales, 2 superiores altius connati, inferior longior, omnes acuti. Petala subæquilonga; vexillum magnum, orbiculari-obcordatum. Stamina ut videtur inclusa, quam stylus complanatus breviora. Ovarium pilis longis rectis arcte appressis densissime vestitum. Legumen leviter curvatum, 4–5 cm. longum, complanatum, circiter 8–10-spermum. Semina oblonga, circiter 3 mm. longa, corrugata, brunnea.—*T. Hookeriana*, Baker, Flora, 72, non Wight et Arn.; Fl. Brit. Ind., ii, 113, pro parte.
MAHÉ: Common, Horne, 294, 481.
Horne notes that it was common in all the islands, but we have seen no other Seychelles specimens.

DERRIS ULIGINOSA Benth. in Pl. Jungh. i, 252; Fl. Austral. ii, 272; Hemsl., Bot. Chall., i, pt. 3, p. 143. *Pongamia glabra* Baker, Flora, 87, quoad specimina Horneana, n. 482, citata.
MAHÉ: Sea-shore, Thomasset, 70; Baie Lazare, Gardiner.
SILHOUETTE: Coast liane, on mangroves, etc., Gardiner, xii.

LEGUMINOSÆ-CÆSALPINIÆ.

Cassia (Chamæcrista) aldabrensis Hemsl., sp. n; species *C. serpenti* (Americæ tropicæ incola) simillima, differt petiolo communi basi haud piloso, foliolis numerosioribus apice rotundatis haud apiculatis.

Herba monocarpica vel interdum frutescens et perennans, 15–60 cm. alta, a basi ramosa, caulibus ramisque gracillimis obscure parceque puberulis. Folia 1–2 cm. longa; foliola 5–10- sed sæpius 6-juga, oblonga, vix obliqua, 2–4 mm. longa, utrinque rotundata, conspicue venosa. Flores axillares, solitarii, vix 1 cm. diametro; pedicelli gracillimi, folia fere æquantes. Legumen immaturum tantum visum, lineare, 2·5–3 cm. longum, circiter 3 mm. latum, rectum, circiter 12-spermum.
ALDABRA: Thomasset, 231, 262; Dupont, 123.
This is very like *C. serpens* L., an American species, but differs in the characters indicated and also in the flowers.

LEGUMINOSÆ-MIMOSEÆ.

Pithecolobium ambiguum Hemsl., sp. n.; species *P. geminato* similis, sed robustior, inermis, foliolis circiter 10-jugis et capitulis haud paniculatis.

Frutex, ut videtur, fere omnino glaber, ramis florigeris rigidis, cortice albido toruloso. Folia pari-bipinnata; pinnæ unijugæ, 3–4 cm. longæ; foliola 8–11-juga, sæpius 10-juga, rhachi gracillima canaliculata, oblique oblonga, 5–10 mm. longa, apice rotundata, basi subtruncata, supra nitida, subtus venosa. Flores capitati; capitula præcipue ad nodos jam defoliatos solitaria, nonnunquam geminata vel ternata, multiflora, siccitate 1·5–2 cm. diametro; pedunculi graciles, 1–1·5 cm. longi, puberuli, uniglandulosi. Calyx campanulatus, circiter 1 mm. longus, tubo brevissimo, lobis rotundatis ciliolatis. Corolla campanulata, circiter 5 mm. longa, lobis brevibus recurvis. Stamina numerosissima, longe exserta, filamentis basi tantum connatis. Ovarium breviter stipitatum multiovulatum. Legumen ignotum.

ALDABRA: Fryer, 39.

ROSACEÆ-CHRYSOBALANEÆ.

Parinarium Gardineri Hemsl. sp. n.; species *P. capensi* Harv. similis sed foliis ovali-oblongis 3–5 cm. tantum longis, paniculis amplioribus folia longe superantibus et petalis ovali-oblongis.

Arbor vel frutex dense ramosus, novellis aut tomentosis aut villosis. Rami florigeri flexuosi, internodiis quam foliis multo brevioribus. Folia subdisticha, distincte petiolata, coriacea; lamina ovali-oblonga vel nonnunquam sublanceolata, sæpius 3–5 cm. longa, utrinque obtusa, margine leviter incrassata, supra cito glabrescentia, subtus albido- vel ferrugineo-tomentosa; venæ primariæ transversæ numerosæ, crebræ, fere rectæ, utrinque sat conspicuæ; petiolus 4–5 mm. longus. Flores parvi, bibracteolati, bracteolis sericeo-villosis alabastra obtegentibus, paniculati, præter petala staminaque intra extraque villosi. Paniculæ terminales, ramis inferioribus axillaribus, densæ, sæpius 6–10 cm. longæ latæque. Calyx circiter 5 mm. longus; dentes tubum fere æquantes. Petala ovali-oblonga, vix 1·5 mm. longa (an plane evoluta?) Stamina circiter 10. Ovarium biloculare, loculis uniovulatis; ovula erecta. Drupa oblonga, circiter 4 cm. longa, lævis.

MAHÉ: From Morne Blanc; given me by Père Anget, Gardiner.

SAXIFRAGACEÆ-ESCALLONIEÆ.

BREXIA MADAGASCARIENSIS Thouars, ex Ker-Gawler in Bot. Reg. t. 730 (1823); Baker, Flora, 97; Oliver, Fl. Trop. Afr. ii, p. 385; Thonner, Die Blütenpflanzen Afrikas, t. 61.—*Brexia heterophylla* Noronha ex Bojer, Hort. Maurit. (1837), p. 52 (nomen nudum); Tulasne in Ann. Sc. Nat. sér. 4, viii, 159, cum descriptione plena.—*B. spinosa* Lindl., Bot. Reg. t. 872 (1825); Colla, *Hortus Ripulensis*, App. iv, p. 7, t. 3 (1831); Schnizlein, *Iconographia*, t. 170*, fig. 2 (*madagascariensis*) Dupont Report, p. 36.—

B. spinosa, var. *integrifolia*, Reichb., *Iconographia*, t. 222.—*B. integrifolia* Schnitzlein, *l. c.*, fig. 1. — *B. chrysophylla* Sweet, Hort. Brit. ed. 1 (1827), p. 492, absque descriptione.—*B. serrata* Presl, Repert. Bot. i, p. 190 (1834).—*B. microcarpa* Tulasne, *l. c.* 160.—*B. acanthifolia*, *B. amplifolia*, *B. digyna*, and *B. ovalifolia* Noronha MS., fide Tulasne, *l. c.*—*B. Lucanana* Lubbers, Cat. Pl. Rar. 1880, nomentantum. — *Venana madagascariensis* Lam., Illustr. ii, 99, t. 131. *Thomassetia seychellana* Hemsl. in Hook. Ic. Pl. t. 2736, (1902).

MAHÉ: Summit of Mount Sebert at about 540 metres, Thomasset, 33; Morne Blanc, Thomasset; without locality, Gardiner. SILHOUETTE: Very common in various localities, including summit of Mare aux Cochons, 720 metres, Gardiner.

I have given the whole synonymy, so far as it is known to me, of this singular plant, which has puzzled several writers. Lindley made it the type of his family *Brexiaceæ*, associating with it *Roussea*, *Ixerba*, *Argophyllum*; and I, failing at first to identify it, named it *Thomassetia* and placed it in the *Ternstrœmiaceæ*.

RHIZOPHORACEÆ.

Weihea Thomassetii Hemsl., sp. n.; species *W. Flanaganii* et *W. Gerrardii* Schinz. (incolæ Africæ australi-orientalis) similis, differt foliis majoribus obscure denticulatis, petalis circiter sexfidis et ovario pilis longiusculis erectis parce vestito.

Frutex præter flores glaber, ramis floriferis gracilibus ad nodos manifeste incrassatis, internodiis quam foliis multo brevioribus. Folia opposita, exstipulata, petiolata, coriacea, tenuiuscula, oblongo-lanceolata, absque petiolo brevi 4-6 cm. longa, apice obtusa vel obtusissima, basi cuneata, margine integra vel, præcipue supra medium, obscure denticulata; costa infra elevata; venæ immersæ, obscuræ; petiolus sæpius circiter 5 mm. longus. Flores vix 1 cm. diametro, in axillis foliorum numerosi, fasciculati, pedicellati; pedicelli puberuli, juxta calycem articulati, circiter 5 mm. longi, basi bracteis 2 concavis fulti. Calyx subcarnosus, pubescens; tubus brevis, fere hemisphæricus; lobi sæpius 5, valvati, oblongo-lanceolati, 3–4 mm, longi, obtusiusculi. Petala 5, angusta, circiter 5 mm. longa, deorsum attenuata, fere unguiculata, apice fimbriata. Discus obsoletus. Stamina circiter 15; filamenta filiformia, inter se libera, petala subæquantia. Ovarium in calycis tubo fere liberum, pilis longis erectis parce instructum, 3-loculare, obscure trilobum; stylus stamina vix excedens, stigmate obscure trilobo. Ovula in quoque loculo 2, collateralia, ab apice loculi pendula. Fructus ignotus.

ALDABRA: Sheltered places, Thomasset, 224.

J. M. Hildebrandt's 3202, from Nossibé, collected in 1879, is evidently the same species with somewhat larger leaves.

The genera *Weihea*, *Cassipourea*, and *Dactylopetalum* are very closely allied, and an examination of the whole of the species might lead to changes in their delimitation.

MYRTACEÆ.

EUGENIA species, foliis brevissime petiolatis crassis coriaceis ellipticis vel nonnunquam fere orbicularibus 3–5 cm. longis apice emarginatis basi rotundatis margine plerumque supra medium obscure crenulatis creberrime venosis. Florum frustra tantum adsunt.

MAHÉ: Plateau above La Mare aux Cochons, G. de l'Isle. This was received at Kew after the publication of Baker's Flora.

BEGONIACEÆ.

Begonia seychellensis Hemsl., sp. n.; species *B. apteræ* Roxb. arcte affinis, a qua differt imprimis omnibus partibus majoribus, foliis amplis latioribus quam longis et floribus utrinque sexus apetalis.

Frutex carnosus, nonnunquam usque ad 1·2 m. altus (Horne), omnino glaber, caulibus crassis ramosis. Folia longe petiolata; lamina valde oblique rotundato-elliptica, interdum usque ad 3 dm. lata sed sæpius in ramis floriferis 1–1·5 dm. lata, basi cordata, paucilobata, lobis latis brevibus, margine simul obscure denticulata, utrinque viridia vel subtus rubra. Inflorescentia axillaris, 2-3-chotoma, quam folia brevior; pedunculi sæpius triflori, flore centrali ♂ ebracteolato, lateralibus ♀ bibracteolatis, bracteolis ovarium vestientibus. Flores albi, haud numerosi. Sepala 2, orbiculari-cordata vel elliptico-cordata, circiter 1 cm. diametro. Stamina circiter 20, filamentis liberis brevissimis. Styli 3, bifidi, ramulis semitortis. Fructus baccatus, oblongo-ellipticus, circiter 2 cm. longus, compressus, apterus; placentæ 3, parietales, 2-lamellatæ, lamellis utrinque polyspermis. Semina numerosissima, subquadrata, vix 0·5 mm. longa, cristata, lineolato-canaliculata.—*B. aptera* var. Baker, Flora, 129.

MAHÉ: Common above 360 metres, Gardiner; original forests, Neville. SILHOUETTE: Common by streams above 450 metres, Gardiner, 111; Neville.

" Common in moist, shady forests in all the islands." Horne.

The Seychelles specimens are uniformly different from typical *B. aptera*, both from Mauritius and Bourbon. The leaves of *B. aptera* are obliquely lanceolate and almost caudate-acuminate, and the female flowers have petals.

ARALIACEÆ.

GASTONIA SECHELLARUM Harms in Engler & Prantl Natürl. Pflanzenf. iii, 8, p. 43. *Polyscias sechellarum* Baker, Flora, 128.

MAHÉ: A tall, slender tree found in mountain forest, Cascade estate, Thomasset, 175. Ternué; tree in dark jungles, at 360 metres, Gardiner. SILHOUETTE: *La Reserve*, Gardiner.

Baker reduced *Gastonia* to *Polyscias*, but the inarticulated pedicels and other characters of the former are generally regarded as of generic value. Balfour (Bot. Rodriguez, 44) discusses the question and restores *Gastonia*, and Harms in the place cited above follows him. I had arrived at the same conclusion independently. Horne's specimen on which this species was established is labelled, in his handwriting, "272, Frigate Island, August, 1871. His Excellency Sir A. H. Gordon." Under the same number in Horne's MS. is the following entry: "Also seen on the sea-shore of Praslin, Mahé and Curieuse. Stem erect, 10–15 ft. in height." This seems improbable in the face of other records and the habitats of subsequent specimens. Gardiner's specimen from Silhouette consists of parts of a leaf from a tree 40 ft. high. The entire leaf must have been at least 2 ft. long and the largest leaflets between 8 and 9 in. long. The rhachis of the old leaves readily disarticulates at the nodes immediately under each pair of leaflets.

Gastonia sechellarum has pedicelli continui, calyculus nullus, stamina 15 (tot quot petala, Bentham et Hooker), et ovarium 12-loculare.

[POLYSCIAS CUTISPONGIA Baker, Flora, 127 (*Gastonia cutispongia* Lam.) is there erroneously recorded from Seychelles. It should have been Mahé, Mauritius. There is a so-called Mahé forest in Mauritius.]

GEOPANAX PROCUMBENS Hemsl. in Hook. Ic. Pl. t. 2821 (1906).

MAHÉ: Cascade Estate at 450 metres, growing on and among rocks of rough cliff, Thomasset, 192. SILHOUETTE: Mare aux Cochons, Gardiner, vii, and 32.

INDOKINGIA CRASSA Hemsl. in Hook. Ic. Pl. t. 2805 (1906).

MAHÉ: At 600 metres; not common, Horne, 273; mountain forest, Cascade Estate and Morne Blanc, Thomasset, 117; above Ternué and Morne Pilot, Gardiner. SILHOUETTE: Jungle at 660 metres, Gardiner.

RUBIACEÆ.

OLDENLANDIA CORYMBOSA Baker in Kew Bull., 1894, 148, an Schinz in Abhandl. Senckenb. Naturf. Gesellsch. xxi, 91 (?), non L.

Herba novellis obscure puberulis, lævis, erecta, 15–40 cm. alta, perflorifera, ut videtur monocarpica. Caulis gracilis, sursum subverticillatim multiramosus, ramis erectis obscure angulatis ultimis pedicellisque fere filiformibus. Folia anguste lanceolata, 1–2 cm. longa, maxima 5–6 mm. lata. Flores 4-meri, minimi, numerosissimi, secus ramulos subverticillatim fasciculati. Calycis dentes angusti, acuti, circiter 0·5 mm. longi, sinubus latis ciliolatis. Corolla puberula, hypocrateriformis, 2–3 mm. longa; lobi quam tubus fere dimidio breviores. Capsula subglobosa, circiter 2 mm. diametro, oligosperma.

ALDABRA: Abbott. ASSOMPTION: Dupont, 108, 108 bis.

OLDENLANDIA, species nova?

Herba omnino glabra, inermis, procumbens, ramosissima, ramis gracillimis fere filiformibus. Folia lævia, linearia, 1–2 cm. longa, sæpius circiter 1 mm. lata, interdum usque ad 2 mm. lata, acuta, obscurissime denticulata; stipulæ membranaceæ, acutæ. Flores minimi, tetrameri, in paniculas parvas subterminales et axillares dispositi. Calycis dentes deltoidei, acuti, vix 1 mm. longi. Corolla subrotata, lobis circiter 2 mm. longis. Capsula oligosperma.

ALDABRA: Thomasset, 260.

OLDENLANDIA species adhuc indescripta?

Species ex affinitate *O. corymbosæ* Baker in Kew Bull. 1894, 148, non L. sed humilior, omnino glabra, caule e basi multiramoso, ramis pergracillimis. Folia lineari-lanceolata, circiter 1 cm. longa. Flores 4-meri. Calyx inter dentes eciliatus; dentes 1 mm. longi, vix acuti. Corolla fere tubulosa, circiter 3 mm. longa; lobi deltoidei, quam tubus dimidio breviores. Capsula 1–1·5 mm. diametro.

ALDABRA: Fryer, 46.

I do not venture to give names to these species of *Oldenlandia*, although I have not succeeded in matching them, because they may all be introduced plants.

TARENNA NIGRESCENS Hiern in Oliv. Fl. Trop. Afr. iii, 92, non Warb. in Engler Bot. Jahrb. xiii, 431. *Coptosperma nigrescens* Hook. f. in Benth. et Hook. f. Gen. Pl. ii, 87. *Webera sechellensis* Baker, Flora, 139.

MAHÉ: Cascade Estate, Thomasset, 121. SILHOUETTE: Jungle above Mare aux Cochons, Gardiner, xv. ALDABRA: Dupont, 32; Fryer, 98.

The specimens from Aldabra are very different in foliage from the Seychelles specimens, but the floral characters are essentially the same.

RANDIA LANCIFOLIA Hemsl., nom. nov.; species distincta foliis crassissimis coriaceis rigidissimis, floribus parvis in axillis foliorum fasciculatis.

Arbor parva (Thomasset), præter flores undique glabra. Rami florigeri crassiusculi, rigidi, recti, internodiis quam foliis multo brevioribus. Folia breviter petiolata, crassissime coriacea, oblongo-lanceolata, sæpius 10–15 cm. longa, sed interdum usque ad 25 cm. longa, maxima 8 cm. lata, apice obtusa vel rotundata, basi cuneata vel subrotundata; venæ immersæ, obscuræ; petiolus crassus, 5–10 mm. longus; stipulæ latæ, truncatæ, simul apiculatæ, arcte appressæ. Flores corollæ forma dimorphi, an vere unisexuales? parvi, circiter 1–1·5 cm. longi latique, in axillis foliorum fasciculati, fasciculis paucifloris, pedicellati; pedicelli flores æquantes vel breviores, basi bracteis connatis apiculatis singillatim involucrati. Calycis limbus brevissimus, 5-dentatus; dentes minuti, acuti, puberuli, sinubus latis vel acutis. Corolla anguste vel latiuscule infundibularis; lobi 5, contorti, oblique ovato-oblongi vel fere orbiculares, obscure ciliolati; tubus intus infra stamina villosus. Stamina 5; antheræ medio affixæ, subsessiles, fere omnino inclusæ. Ovarium 2-loculare, interdum angustum loculis cassis, sæpius latius loculis multiovulatis; ovula in quoque loculo longitudinaliter biseriata; stylus cylindricus, indivisus vel multo crassior et alte bifidus. Fructus (unicus imperfectus tantum visus) oblongus, circiter 1·5 cm. longus, loculis 6–8-spermis. Semina forma irregularia, suborbicularia, compressa, 4–5 mm. diametro, albida, embryone minutissimo.—*Pyrostria lancifolia* Bojer; Baker, Flora, 149, in nota, absque descriptione. *Psychotria Wrightii* Baker, Flora, 156.

MAHÉ: Various localities; Horne, 250; Thomasset, 72, 90

Gardiner. SILHOUETTE: Gardiner, 15, x, xxxiv. PRASLIN: Very common in the woods on the ridges, Schimper.

RANDIA SERICEA Hemsl. *Ixora sericea* Baker, Flora, 151.

MAHÉ; On the highest summits, Thomasset; Gardiner. SILHOUETTE: Summit above Mare aux Cochons, 2400 ft. Gardiner, 6, xvii.

This handsome tree is certainly not an *Ixora*, as it has a many-seeded capsule; the seeds being immersed in the placenta gave rise, no doubt, to Baker's error in classification. The Malayan *R. longiflora* Lam. is a similar plant, and *R. angolensis* Hutchinson (Kew Bull. 1908, 292) is a closely allied species. *R. sericea* and the latter have a character in common which I have not met with in the description of any other species of *Randia*: it is the presence of numerous slender obclavate glands clustered inside at the base of the calyx-lobes.

TRICALYSIA CUNEIFOLIA Baker in Kew Bull. 1894, 148. Descriptio hic ampliata. Species insignis corollæ ore copiosissime barbato.

Frutex speciosus floribus albis (Dupont), præter flores undique glaber. Rami florigeri recti, rigidi, graciliusculi, cortice albido. Folia pauca ad apices ramorum conferta, brevissime petiolata (stipulis parvis e basi lata aculeiformibus), demum subcoriacea, oblongo-lanceolata, interdum elliptica, sæpius 4–5 cm. rarius 7–8 cm. longa, apice rotundata vel obtuse acuminata, basi rotundata vel cuneata; venæ inconspicuæ. Flores numerosissimi, infra folia hornotina ad nodos contiguos foliis jam denudatos dense fasciculati, albi, 5-meri, rarius 6-meri, 10–12 mm. diametro. Pedicelli filiformes, 5–10 mm. longi, bracteolis 2 minutis instructi, basi bracteis latis brevibus involucrati, involucris 2–3-floris. Calyx circiter 2 mm. longus latusque; tubus hemisphæricus, dentibus deltoideis acutis. Corolla infundibularis; tubus cylindricus, circiter 5 mm. longus, intus infra medium glaber, supra medium densissime barbatus, pilis unicellularibus longissimis ligulatis planis longe exsertis; lobi contorti, ovato oblongi, tubum fere æquantes, apiculati. Stamina ori corollæ inserta, filamentis brevissimis; antheræ circiter 5 mm. longæ, dorso infra medium affixæ, omnino exsertæ, divaricatæ, basi integræ, apice connectivo producto membranaceo linguiformi appendiculatæ. Discus annularis, carnosus, glaber. Ovarium 2-loculare, pauciovulatum; stylus glaber, longe exsertus, alte bifidus; ovula in quoque loculo plura, placentis carnosis affixa, pendula, partim immersa. Fructus globosus, 4–5 mm. diametro, 2-locularis, loculis circiter 4-spermis. Semina nigra, verruculosa, nitida, forma irregularia, 2–3 mm. diametro.

ALDABRA: Fryer, 91; Dupont, 3, 132.

TIMONIUS JAMBOSELLA Thwaites, Enum. Pl. Ceyl. p. 153; King & Gamble, in Journ. As. Soc. Beng. lxxii, p. 53. *T. flavescens* Baker, Flora, 144.

MAHÉ: Morne Blanc, Thomasset; Cascade Forest, Thomasset,

30; Gardiner. SILHOUETTE: Hill above Mare aux Cochons, Gardiner, 10, v.

PLECTRONIA ACUMINATA Baker, Flora, 143. *P. carinata* Baker, *l. c.*

MAHÉ: Cascade Estate, Thomasset, 83. SILHOUETTE; Gardiner, 27.

Additional specimens necessitate the reduction of *P. carinata.*

Pavetta supra-axillaris Hemsl., sp. n.; species *Tarennæ nigrescenti* Hiern similis, differt foliis minoribus, venis minus conspicuis et præcipue cymis lateralibus supra-axillaribus.

Frutex præter flores undique glaber, ramis florigeris gracilibus, internodiis quam foliis brevioribus. Folia siccitate nigrescentia, graciliter petiolata, subcoriacea, lanceolata, cum petiolo 5–9 cm. longa, obtusiuscula, basi cuneata, venis immersis inconspicuis. Cymæ supra-axillares, parvæ, 1–2 cm. diametro, pedunculatæ pedunculis gracillimis 1–1·5 cm. longis; pedicelli floribus breviores; bracteæ et bracteolæ minimæ, albo-puberulæ. Flores pentameri, bene evoluti non visi; alabastra circiter 5 mm. longa. Calycis lobi breves, fere orbiculares, contorti, præcipue ad margines intusque albo-farinosi. Corolla extus puberula; lobi contorti, ovato-oblongi, rotundati, emarginati. Ovarium 2-loculare, loculis uniovulatis. Stylus clavatus.

ALDABRA: Ile Esprit; "Probably introduced," Fryer.

Psychotria pallida Hemsl.; an species nova indescripta?

Frutex præter corollam intus omnino glaber, ramulis, florigeris foliisque cinereis; internodia petiolos æquantia. Folia pallida, coriacea, petiolata; lamina oblongo-lanceolata vel oblanceolata, 4–9 cm. longa, sed sæpius 6–8 cm. longa, subobtusa, basi cuneata, venis obscuris; petiolus sæpius circiter 1 cm. longus; stipulæ latæ, fere truncatæ, integræ. Cymæ terminales, densæ, breviter pedunculatæ, 4–5 cm. latæ; pedicelli quam flores breviores; bracteæ parvæ. Flores subcarnosi, pentameri. Calycis limbus brevis, cupularis, obscure denticulatus. Corolla infundibularis, circiter 6–7 mm. longa; lobi lati, quam tubus breviores, vix acuti, demum reflexi, fauce dense barbata. Stamina inclusa. Ovarium biloculare, loculis uniovulatis; stylus breviter exsertus, bifidus. Fructus ignotus.

MAHÉ: Cascade Estate, Thomasset, B.

PSYCHOTRIA species nova?

MAHÉ: Morne Blanc, Thomasset.

This differs from the Cascade specimens labelled B. in having dark-coloured, more coriaceous, oblanceolate leaves; but the floral characters are essentially the same, except that this has partially exserted stamens and a short included style. But it is difficult to deal satisfactorily with solitary specimens in this very large genus.

PSYCHOTRIA species indescripta?

Frutex glaber, ramis gracilibus. Folia siccitate pallida, longiuscule petiolata, vix coriacea, oblanceolata, cum petiolo

9–12 cm. longa, abrupte breviterque acuminata, subacuta, bas cuneata, venis immersis obscuris. Cyma terminalis (una tantum visa), vix 1·5 cm. lata, subsessilis. Flores aperti non visi, pentameri. Calycis limbus cupularis, obscure dentatus. Corolla (bene evoluta non visa) 2–3 mm. longa; lobi valvati, quam tubus longiores, fauce villosa. Ovarium 2-loculare, loculis uniovulatis.

ALDABRA: Dupont, 24.

PSYCHOTRIA species indescripta?

Frutex (exemplum fructigerum tantum visum) novellis glabris. Folia breviter petiolata, vix coriacea, oblongo-lanceolata, cum petiolo brevi 6–8 cm. longa, acute acuminata, basi cuneata, venis inconspicuis. Cymæ terminales, umbellatim ramosæ, 3–4 cm. diametro, pedunculatæ, pedunculis 1·5–2 cm. longis; pedicelli brevissimi. Fructus dipyrenus, oblongus, 4–5 mm. longus, costatus, calycis dentibus coronatus.

ALDABRA: Dupont, 115.

A specimen, also in fruit only, in the Kew Herbarium, from Andrangaloaka, Central Madagascar, collected by G. W. Parker, is apparently the same as Dupont's n. 115.

AMARACARPUS PUBESCENS Blume, Bijdr. Fl. Nederl. Ind., p. 954. *Psychotria ferruginea* Baker, Flora, 156. *Neoschimpera heterophylla* Hemsl. in Hook. Ic. Plant. t. 2810.

MAHÉ: Mountain forest, Thomasset, 181. SILHOUETTE: Mare aux Cochons at 600 metres and upwards, Gardiner, xvii.

Psathura Fryeri Hemsl., sp. n.; species distincta foliis confertis tenuibus, cymis terminalibus quam foliis brevioribus.

Frutex floribus albis (Dupont), novellis puberulis. Rami florigeri breves; internodiis brevissimis. Folia ad apices ramorum conferta, breviter petiolata, papyracea, lanceolata vel lineari-lanceolata, 5–9 sed sæpius 7–8 cm. longa, acute acuminata, basi cuneata, supra glabra, subtus præcipue secus costam venasque puberula; venæ primariæ utrinque circiter 8; stipulæ fimbriatæ. Flores parvi, 5–7 mm. longi, puberuli, subsessiles, in cymas terminales puberulas foliis breviores 2–4 cm. diametro dispositi. Calycis dentes minuti, inæquales. Corolla cylindrica; lobi valvati, cucullati; os pilis longissimis cylindricis unicellularibus ornatum. Stamina inclusa. Ovarium 7–9-loculare, loculis 1-ovulatis; styli rami isomeri, brevi. Drupa 4–5 mm. diametro.

ALDABRA: Dupont, 31, 44, 91; Fryer, 44; Thomasset, 240. COSMOLEDO: Thomasset, 242.

Also Comoro Islands, L. Humblot, 47.

COMPOSITÆ.

Vernonia aldabrensis Hemsl., sp. n.; species fruticosa quibusdam *Psiadiæ* speciebus similis.

Frutex ramosus, novellis minute puberulis; ramuli florigeri recti, rigidiusculi; internodia circiter 1 cm. longa. Folia alterna, recurva, petiolata, fere membranacea, glabrescentia, lanceolata, cum petiolo gracili 5–8 cm. longa, subacuta, basi cuneata, integra, venis primariis paucis subtus sat conspicuis. Capitula numerosa, multiflora, 5–8 mm. diametro, in corymbos compositos terminales hemisphæricos 5–10 cm. diametro disposita; ramuli graciles; pedunculi fere filiformes, bracteis paucis minutis instructi. Involucri bracteæ circiter 6–seriatæ, pubescentes, ciliolatæ, extimæ parvæ, lineares; intermediæ gradatim majores, lanceolatæ, longe acuminatæ, rigidæ; interiores longiores, scariosæ, late oblongæ, circiter 5 mm. longæ, apice rotundatæ. Corolla plus minusve glandulosa; lobi sublineares, tubo saltem dimidio breviores. Antheræ basi vix sagittatæ. Styli rami exserti, subulati, hirtelli. Achenia glandulosa, 10-costata, sursum crassiora, 2–3·5 mm. longa. Pappi setæ albidæ, numerosæ, uniseriatæ, hirtellæ.

ALDABRA: Fryer, 41.

PSIADIA?

ALDABRA: Ile Michel; shrub with yellow flowers, Dupont, 96. A fragment bearing a few empty involucres.

GYNURA SECHELLENSIS Hemsl., nom. nov. *Senecio sechellensis* Baker, Flora, 178.

MAHÉ: Cascade Estate and Morne Blanc, Thomasset, 190. SILHOUETTE: Gardiner.

This plant has the long, filiform, puberulous style-arms characteristic of *Gynura*; hence I have removed it from *Senecio*.

OLEACEÆ.

JASMINUM MAURITIANUM Bojer, species valida; Baker, Flora, errore sub *J. auriculato* citata, 220.

MAHÉ: Morne Grande, Gardiner.

Jasminum aldabrense Hemsl., sp. n.; *J. mauritiano* Bojer simile, differt imprimis foliis supra nitidis, calycis dentibus longiusculis subulatis et corollæ lobis 5 cordato-ovatis acutis.

Frutex scandens vel vagans, ramis florigeris teretibus gracilibus pubescentibus, internodiis quam foliis brevioribus. Folia opposita, breviter petiolata, subdecussata, inæqualiter trifoliolata, cum petiolo 3–6 cm. longa; foliola petiolulata, vix coriacea, sæpius ovato-elliptica vel elliptica, rarius fere orbicularia, 1–4 cm. longa, lateralia quam intermedium plus quam dimidio minora, utrinque rotundata, apiculata, præter costam subtus pubescentem glabra, supra nitida; petiolus petiolulique graciles, pubescentes. Flores circiter 2 cm. longi, in paniculas axillares densas folia subæquantes dispositi; ramulis pedicellisque brevibus gracilibus pubescentibus; bracteæ bracteolæque parvæ, lineares. Calyx pubescens; lobi subulati, 2–3 mm. longi, persistentes, demum recurvi. Corolla hypocrateriformis, 2–2·5 cm. longa; limbi lobi subcordato-ovati vel lanceolati, acuti, quam tubus paulo breviores. Stylus breviter exsertus. Fructus ignotus.—*J. mauritianum* Baker in Kew Bull. 1894, 149, et Schinz in Abhandl. Senckenb. Naturf. Gesellsch. xx, 88, non Bojer.

ALDABRA: Abbott; Thomasset, 247; Fryer, 6, 21.

ASCLEPIADACEÆ.

MICROSTEPHANUS CERNUUS, N. E. Br. in Kew Bull. 1895, 249;

Hook. Ic. Pl. t. 2994. *Astephanus cernuus*, *A. ovatus* et *A. arenarius*, Decne. in DC. Prodr. viii, 507. *A. arenarius*, Decne.; Baker in Kew Bull. 1894, p. 149. Dupont, Report, p. 39.

ALDABRA: Common on the beach, Dupont, 102, 130; Thomasset, 215, 254; Fryer, 89, 97.

A monotype widely spread in East Tropical Africa and Madagascar.

ASCLEPIAS FRUTICOSA L.; N. E. Br. in Fl. Capensis, iv, i, p. 691. *Gomphocarpus cornutus* Baker, Flora, p. 228, non Decne. *G. fruticosus*, R. Br.; Benth. Fl. Austral. iv, p. 326.

SILHOUETTE: Mare aux Cochons, Gardiner. FRIGATE ISLAND: Horne, 363.

Secamone Fryeri Hemsl., sp. n.; species *S. zambesiacæ* Schlecht. similis, recedit foliis coriaceis ellipticis et cymis multifloris folia sæpius excedentibus.

Frutex scandens, interdum volubilis, undique glaber, ramis florigeris graciliusculis; internodia quam folia nonnunquam breviora. Folia distincte petiolata, coriacea, elliptica vel interdum fere orbicularia, cum petiolo 4–8 cm. longa, sed sæpius circiter 5 cm. longa, acuta vel subobtusa; venæ immersæ, inconspicuæ. Cymæ compositæ, terminales vel laterales, densæ, subternatim ramosæ, usque ad 8 cm. diametro sed sæpius minores; bracteæ angustæ, fere lineares, crassæ, concavo-convexæ, vix acutæ, quam flores breviores. Flores 4–5 mm. diametro, brevissime pedicellati. Sepala oblongo-elliptica, circiter 1·5 mm. longa, apice rotundata. Corolla fere rotata, limbi lobi oblongi, circiter 2 mm. longi, apice rotundati. Coronæ squamæ ligulatæ, stamina superantes. Folliculi (maturi non visi) fere teretes, sursum attenuati, acuti, horizontales, 4–8 cm. longi.

ALDABRA; Thomasset, 255; Dupont, 47; Fryer, 61.

Mr. Dupont also collected this in Assomption, n. 115.

I have not succeeded in identifying this with any Madagascar or African species, but there is little doubt that, like all others of this category, it did not originate in the coral islands.

TOXOCARPUS SCHIMPERIANUS Hemsl. in Hook. Ic. Pl. t. 2807.

MAHÉ: Without locality, Horne, 533; summit of Mount Sebert, 540 metres; the only place where I have found it, Thomasset, 49.

SAPOTACEÆ.

No two authors seem to agree in the delimitation of the genera of this family. Several botanists have written in a discursive manner on the subject, and proposed new genera without clearly defining them, basing them on characters which do not correlate. Others have reduced some of the old genera, and I follow in reducing *Imbricaria* to *Mimusops*.

SIDEROXYLON ATTENUATUM A. DC. Prodr. viii, 178. Baker, Flora, 193, excl. syn. *S. ferrugineum* Hook. et Arn., Bot. Beech. Voy., p. 266, t. 25.

MAHÉ: Common, Dupont, 5. SILHOUETTE: Jungle above Mare aux Cochons, Gardiner, xxxi. PRASLIN: Dupont.

This species was founded on Cuming's 1243, under which number there may be two species; one having relatively small leaves and the other having leaves quite like those of the Seychelles specimens. *S. ferrugineum* is from Bonin and is quite distinct.

SIDEROXYLON INERME L.; Fl. Cap. iv, 1, p. 438, ex Mez in Engler Pflanzenr. iv, p. 397. *Myrsine cryptophlebia* Baker in Kew Bull. 1894, 149. Schinz in Abhandl. Senckenb. Naturf. Gesellsch. xxi, 88.

ALDABRA: Dupont, 7, 14, 106, 133; Fryer, 38. Also collected by W. L. Abbott and A. Voltzkow.

MIMUSOPS SECHELLARUM Hemsl., nom. nov. *Imbricaria sechellarum*, Oliver in Hook. Ic. Pl. t. 2315. Descriptio hic amplificata.

Arbor excelsa, præter flores glabra, ramis florigeris mediocriter crassis. Folia tenuiter coriacea, oblongo-elliptica, cum petiolo 1·5–3 cm. longo, sæpius 10–15 cm. longa, maxima visa 10 cm. lata, utrinque rotundata vel basi subcuneata, apice emarginata, supra nitida, subtus costa elevata, venis tenuibus crebre reticulatis. Flores in axillis foliorum superiorum solitarii vel plures fasciculati; pedunculi 1–2 cm. longi atque calyces ferrugineo-pubescentes. Calycis segmenta 8, persistentia, biseriata, ovato-lanceolata, circiter 8 mm. longa, subobtusa, 4 exteriora ferruginea, 4 interiora albida, paullo minora. Corollæ tubus brevissimus; limbi segmenta 24, quorum 16 exteriora crassa, omnia bifida, vel alia bifida, alia integra vel irregulariter dentata, calycis segmenta vix excedentia; 8 interiora minora, tenuia, integra, stamina foventia. Stamina 8; filamenta brevissima; antheræ dorsifixæ, apiculatæ. Staminodia 8, antheroidea, stamina æquantia, villosissima, caudata. Ovarium strigosum, 8-loculare; stylus glaber, acutatus, inclusus. Fructus pomiformis, globosus, 6–7 cm. diametro, glaber, nudus, 8-locularis vel sæpius abortu loculis paucioribus, loculis unispermis; epicarpium coriaceum; mesocarpium crassum, fungosum; endocarpium fere membranaceum, badium. Semina compresso-ovalia, 3–4 cm. longa, basi acuminata, hilo 7–9 mm. longo; testa crustacea, badia, nitida. Embryo intra albumen carnosum planus, semen æquans; cotyledones tenues, radicula longuiscula.—*Imbricaria* species, Baker, Flora, 195, in nota, quoad folia.

MAHÉ: One plant growing near the sea, Horne, 362; Seashore, Thomasset, 126; without locality, Schimper, 7; Cascade Estate, Thomasset; Gardiner. SILHOUETTE: Glacis, Gardiner, xxxv.

Horne (MS. p. 53) refers to his 361 and 362 as distinct species, and I, with fuller material before me, have no doubt he was right, though both Oliver and Baker, in the places cited above, treat his specimens as of one species.

MIMUSOPS DECIPIENS Hemsl., nom. nov. (olim *Imbricaria*); hæc species a *M. sechellarum* D. Oliv. differt ramis florigeris crassisimis, corollæ segmentis seriei exterioris octo tantum et fructu ovoideo.

M. Imbricaria Willd. (*Imbricaria maxima* Poir.), species etiam similis; sed ab utraque recedit corollæ segmentis exterioribus 32 crispulis.

Arbor excelsa novellis ferrugineo-tomentosis, pilis medio affixis. Rami florigeri crassissimi, petiolorum cicatricibus prominentibus. Folia confertissima, petiolata, crassissima, coriacea, oblonga, obovata, elliptica vel fere orbicularia, cum petiolo 1·5–2 cm. longo 7–13 cm. longa, 4–9 cm. lata, apice rotundata, nonnunquam leviter emarginata, basi rotundata vel subcuneata, citissimo utrinque glabrescentia, supra nitida, marginata, crebre venosa. Flores circiter 1·5 cm. diametro, pauci, in axillis foliorum superiorum solitarii vel geminati, pedunculis crassis 1·5–2 cm. longis. Calycis carnoso-coriacei segmenta 8, biseriata, ferrugineo-tomentosa, ovato-lanceolata, circiter 1 cm. longa, 4 interiora lanceolata, omnia obtusiuscula. Corollæ tubus brevissimus; limbi segmenta 16, biseriata, 8 exteriora calycem paulo excedentia, alte bifida; 8 interiora minora, tenuiora, auguste oblonga. Stamina 8, petalis interioribus opposita. Staminodia cum staminibus alternantia, petaloidea, villosissima. Ovarium hirsutum, 8-loculare, loculis uniovulatis; stylus glaber, brevis. Fructus ovoideus vel obpyriformis, circiter 5 cm. longus, sæpius abortu 4- vel 5-spermus. Semina badia, nitida, oblonga, subtrigona, circiter 2·5 cm. longa, hilo oblongo 3–4 mm. longo; embryo centralis, cotyledonibus anguste lanceolatis, radicula recta.—*Imbricaria* species Baker, Flora, 195, in nota, quoad folia fructumque no. 361.

MAHÉ: Growing in the higher parts, Horne, 361; Mount Sebert at about 540 metres, Thomasset in 1901, 1903, and 1909.

Hitherto this has been confused with *M. sechellarum*, although Horne, with very imperfect material, recognised that his specimens represented two species. In making a cross section of a fruit collected by Mr. Thomasset I found it to be 5-celled. Two of the cells contained perfect seeds; the other seeds were partly consumed by the larvæ, of which there were about twenty present, measuring some 8 mm. in length.

Mimusops Thomassetii Hemsl., sp. n.; species imperfecte cognita, foliis amplis usque ad 20 cm. longis, pedunculis infra flores subsubito curvatis.

Arbor ramis florigeris mediocriter crassis, novellis parce ferrugineo-puberulis. Folia petiolata, coriacea, oblongo-lanceolata, absque petiolo 10–20 cm. longa, 3–6 cm. lata, apice rotundata, basi subcuneata, venis tenuibus crebre anastomosantibus; petiolus 1·5–3·5 cm. longus. Flores pauci (an semper ?) in axillis foliorum supremorum solitarii vel fasciculati, circiter 2 cm. diametro; pedunculi 2–3 cm. longi, infra florem subito curvati, ut calyx ferrugineo-puberuli pilis medio affixis. Calyx crassus, coriaceus, persistens; tubus (vel receptaculum) hemisphæricus; segmenta (vel sepala) 8, biseriata, valvata, exteriora ovato-lanceolata, vix 1 cm. longa, obscure carinata, obtusiuscula; interiora similia sed paulo minora, dorso obscure canaliculata. Corollæ tubus brevissimus; limbi segmenta 24, bi- vel triseriata; 16 exteriora, lineari-oblonga, calycem vix excedentia, rigida, nunc omnia bifida, nunc

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